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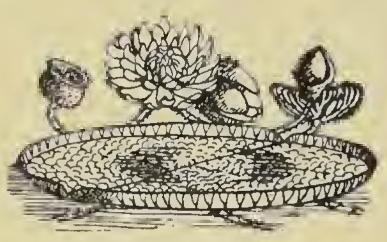

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ERRATA

p. 60, line 11 up : *For* Selected read Selection.
line 10 up : *For* and read in.
p. 175, line 13 : *For* Gratioea read Gratiola.
p. 279, line 4 : *For* S.w. read Sw.
p. 281, line 14 up : *For* S.w. read Sw.
p. 287, line 14 : *For* 28, W. Norfolk read 27, E. Norfolk.
p. 316, line 5 up : *For* Pjhelyi read Uhjelyi.
p. 351, line 13 : *For in* read *of*
p. 378, line 6 up : *For* Celak read Celak.
p. 415, line 3 : For 1.1-4 mm. read 1.1-1.4 mm.
p. 460. line 4 : For *Botany* read Botany.

Supplement to vol. 4 part 4 (WEST NORFOLK PLANTS TO-DAY).

Map facing p. 6, lower margin right hand end for 30 read 60; left margin third line up for 50 read 30.
p. vii, line 10 up : *For* Wisbeach read Wisbech.
p. xiii. line 7 : *For* Goodenstone read Gooderstone.
p. 8, line 3 up : *Delete* semicolon between West Mere and Tottington and replace with comma.
p. 9, line 7 up : For (f. LEUCANTHA (Beck)) read (f. LEUCANTHA (Beck) Airy Shaw)).
p. 12, line 3 : for Breck read Heath.
p. 14, line 15 : for Snettishham read Snettisham.
p. 19, line 14 : delete reference to Barnham Cross Common.
p. 32, line 11 : for Celak read Celak.
p. 35, page head : for ERICACEA read ERICACEAE.
p. 89, line 10 : for Verbeia read Verbena.

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Editor: D. H. KENT

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THE MOUNTAIN FLORA OF LAKELAND

By D. A. Ratcliffe
(The Nature Conservancy)

After the Scottish Highlands, Snowdonia and Upper Teesdale come next in fame as districts for mountain plants in Britain. The Lake Country of Cumberland, Westmorland and Lancashire North of the Sands is less celebrated by far, though only the first region has a greater number of vascular mountain species. The poverty of many hills and the scarcity of those species which attract the greatest interest probably accounts for the poor reputation of the Lakeland fell flora and the relative neglect which it is accorded. One admits that there are woefully few places with a good assemblage of notable plants; moreover, these are either fairly remote or else they include difficult ground. Even so, the number of species adds up to quite an imposing list.

The Lakeland fells were quite well explored for plants by the end of the nineteenth century, and though the last sixty years have produced many new localities for various species, only one completely new discovery has been made during this period. Within the last few years, there has been proof that several species were unjustifiably presumed extinct in the district, whilst the finding of new stations for some plants would indicate that knowledge of distribution is not yet complete. The main sources of information on plant distribution are the three local floras (Baker, 1885; Hodgson, 1898; and Wilson, 1938), but data for the hills are mostly scattered and there is no single account of the mountain plants of the whole region.

I have seen all the plants named in Table 2 growing on the Lakeland fells, with the exception of *Cystopteris montana, Phleum alpinum, Poa balfourii, Vaccinium uliginosum, Veronica serpyllifolia* subsp. *humifusa* and *Euphrasia frigida*. The last two species have been observed recently by other botanists. A few species claimed for Lakeland seem to me to be best regarded as doubtfuls, and likely to have been recorded either in error or through confusion; they are *Cardaminopsis petraea, Gnaphalium supinum, Luzula spicata, Juncus trifidus* and *Cystopteris montana* (the Skiddaw record).

The term "mountain plant" as here applied to Lakeland is arbitrary, and used to indicate those belonging essentially to the hills, instead of referring to definite geographical groups such as Arctic-Alpine. It denotes the species which, in this district, have their headquarters above 1,000 ft., though some of these extend to low levels as well. By this definition, there are included with the exclusively high-level plants others such as *Antennaria dioica* and *Lycopodium clavatum,* which occur on heaths in the lowland country of southern England.

Nomenclature is according to the following works:

VASCULAR PLANTS

List of British Vascular Plants, by J. E. Dandy. London. 1958.

MOSSES

An Annotated List of British Mosses, by P. W. Richards and E. C. Wallace. *Trans. Brit. Bryol. Soc.,* **1**. 1950.

LIVERWORTS

An Annotated List of British Hepatics, by E. W. Jones. *Trans. Brit. Bryol. Soc.,* **3**: 353-374. 1958.

LICHENS

Census Catalogue of British Lichens, by W. Watson. Cambridge. 1953.

AN ECOLOGICAL BACKGROUND

Lakeland forms a single, well-defined geographical region, and sub-division is best made according to valleys and mountain groups, for the county boundaries are meaningless in any account of its natural history.

The distribution and abundance of mountain plants in Lakeland is governed, as elsewhere in Britain, mainly by altitude and soil conditions. Most of the species need a cool climate for their existence, and this condition, more than any other, is implicit in the environment at high levels. Scafell Pike, Scafell, Helvellyn and Skiddaw exceed 3,000 ft., and there are many peaks rising to 2,500 ft. or more. Taking 1,500 ft. as the level at which mountain plants become numerous in this region, there is thus a fairly broad altitudinal (i.e. climatic) zone available to the group. Within this zone, rock and soil type have a great influence on distribution of these plants.

The rocks of the high fells consist mainly of the Borrowdale Volcanic Series, Skiddaw Slates, and large igneous masses of granite and syenite. All these parent materials are predominantly acidic, only the first group containing basic rocks in any quantity, and then very locally. Under a rainfall which exceeds 100 ins. annually on most of the high fells, and tops 150 ins. in the Gable-Bow Fell area, the soils derived from acidic rocks are strongly leached and base-deficient. Even on the basic rocks, leaching is so pronounced that podsolisation is resisted only by some form of flushing (cf. Pearsall, 1950). The majority of the mountain plants are calcicole, and this group is most richly represented on the Helvellyn range, where calcareous rocks outcrop more extensively at high altitudes than in any other massif.

The deep, crag-girt, north and east facing coves of the Helvellyn, Fairfield and High Street ranges, and the great ravines cleaving the flanks of the Scafell range, together harbour nearly all the calcicole species which occur in the region and so form the best hunting-grounds. There are a few good crags on the Pillar, at the head of the Buttermere valley, in the Vale of Newlands, and in Langdale; but most of Copeland Forest, the Great Gable area, the Coniston Fells, the High White Stones group and the Bowfell range, show the poverty of the acidic Borrowdale Volcanic rocks. This Series contains a good deal of calcareous material in Borrowdale itself and in the Vales of Naddle, St. John, Ullswater, Longsleddale and Swindale, but at too low an altitude to support most mountain species. The Skiddaw Slate hills, including Skiddaw, Blencathra, the Grasmoor-Hobcarton group, Robinson and Hindscarth, are barren ground; whilst the Buttermere and Ennerdale syenite, and the Eskdale granite, together occupying a large area of the western fells, are equally unproductive.

The rich Borrowdale Volcanic cliffs contain relatively large amounts of calcium, either as solid calcite in cavities and veins of varying size, or in combined form in the various mineral components, e.g. hornblende. Such rocks, particularly those containing free calcium carbonate, are often softer than the acidic materials of the Series, and break down faster to give base-rich soils. Even on the same crag, however, the rock type is often mixed and the incidence of flushing variable, leading to quite sharp changes in soil base-status locally (cf. Hora, 1947). Sometimes, hard acidic lavas are flushed from calcareous rocks above and show soil conditions more typical of the latter. Even on Helvellyn there are no extensive exposures of uniformly rich rock such as occur on Snowdon or Ben Lawers, and search has to be made for the good patches in the crags. On the Scafell Range, from Glaramara to Wasdale Screes, the basic rocks occur mostly along the shatter belts of fault zones, where there has been strong impregnation with calcium carbonate and ferric oxide. These shatter belts are susceptible to weathering and erosion, so that their tracks are often marked by deep, stream-cut ravines, whose steep and crumbling sides, with their reddish, calcite-bearing rocks, provide suitable habitats for the mountain calcicoles.

The predominant upland communities, acidic grasslands, reflect not only a prevalence of strongly podsolised soils, but also the influence of sheep-farming over a long period. Land management has greatly impoverished the natural vegetation of the fells. Woods have been destroyed wholesale and the tree-limit artificially depressed, whilst fire and the grazing of sheep over every accessible square foot of ground have greatly reduced or locally eradicated ericaceous and herbaceous communities, and granted supremacy to the grasses, rushes and bracken. The mountain calcicoles, having mostly but slight tolerance of competition and/or grazing, have become restricted to situations where steepness of the ground satisfies the need both for open habitats and protection from sheep. Some species do not suffer from the attentions of sheep, and these occur along rill and stream sides, and in open flushes, as well as on the more precipitous ground.

Some calcifuge mountain plants have probably become scarce because they belong to the heath communities which suffer so much from burning and grazing; their restriction to rocky ground is thus an unnatural condition. Others need open habitats and are confined to places where instability prevents the development of closed vegetation.

Palaeo-ecologists have shown that a montane vegetation was everywhere widespread in Britain during Late-glacial times, so that the present mountain flora of Lakeland has become relict in three ways. First, the rising temperature and advancing forests of the Post-glacial Period drove these plants to high levels, whilst the gradual deterioration of the soils under a wet climate and finally, the management of the hills for sheep, have greatly restricted their distribution within the existing montane zone (cf. Godwin, 1949).

THE FLORA

(a) SPECIES OF BASIC ROCKS AND SOILS

Certain plants appear faithfully wherever basic cliffs occur, whereas others are irregularly distributed, often in widely scattered places, and in the extreme case, have only one or two stations. Between these extremes are species of intermediate rarity. Nearly every basic cliff in Lakeland lying above about 1,200 ft. may be relied upon to hold *Sedum rosea, Oxyria digyna, Thalictrum minus, Galium boreale, Rubus saxatilis, Alchemilla wichurae, Cochlearia alpina, Saxifraga aizoides, S. hypnoides, Euphrasia rivularis* and *Asplenium viride.* These plants vary much in abundance locally, and while their soil requirements are rather similar, their typical micro-habitats show some variation. The first six are particularly sensitive to grazing and so are more or less confined to crag-ledges, rocky stream-sides, or (occasionally) screes. The need for open habitats restricts *Asplenium viride* to rock faces, and a preference for shade keeps it mainly in crevices and recesses. *Cochlearia alpina, Euphrasia rivularis* and the two Saxifrages grow equally well on damp, broken slopes, in flushes, and beside rills, and are often more plentiful in these situations than on the main cliffs. *Saxifraga aizoides* and *S. hypnoides* grow locally as pioneers on earthy screes, as in Wasdale, and have colonised in abundance the quarry spoil below Honister Crag, forming distinct tufts with an unusually compact growth.

A few mountain plants have a fairly wide distribution in Lakeland, but are absent from many places where conditions seem suitable in every way. *Saussurea alpina* has a good many scattered localities, but grows sparingly in most of these: Helvellyn and the Pillar are its best stations and here some good clumps occur. This is a plant of high levels, occurring mostly above 2,000 ft., and on the damp soils of shady, flushed ledges. *Polystichum lonchitis* occupies similar habitats, though it tends to be rooted in sheltered crevices and corners, and evidently once had a number of stations in the eastern half of the district. Though probably never a plentiful plant in any locality, the rarity of the Holly Fern has been magnified by the depredations of fern collectors. It still survives sparingly in at least three old haunts. *Thalictrum alpinum, Juncus triglumus, Epilobium alsinifolium* and *Myosotis brevifolia* are plants of rather wet flushes and rill-sides, though all but the last occur on many rock-ledges. None needs particularly rich soils but all are local. The first two grow mainly at high levels, but the second pair descend to 500 ft. in the Vale of St. John.

Saxifraga oppositifolia, Silene acaulis and *Minuartia verna* have their main strongholds on the Helvellyn Range, though the first grows very finely and plentifully on certain crags of the Scafell Range. All fare best on rather dry, crumbling, calcareous rocks, though the Purple Saxifrage commonly appears in a more attenuated form on wet ledges and in basic flushes. Moss Campion sometimes occurs on steep banks at the broken cliff-foot, and the Purple Saxifrage grows in at least one earthy scree, but both are confined to steep, unstable ground. *Minuartia verna* is locally plentiful in close-cropped, rich turf on the upper Westmorland slopes of Helvellyn, but steep rocks are its more usual place.

The last eight plants all tend to favour rather open habitats, where competition is slight, and this tendency is pronounced in nearly all the remaining mountain calcicoles, most of them rarities.

Among the plants particularly associated with dry calcareous rocks elsewhere in Britain are *Draba incana, Potentilla crantzii, Dryas octopetala* and *Ajuga pyramidalis*. In Lakeland, all four belong to steep and rather exposed rock faces, always of strongly calcareous material. Alpine Cinquefoil grows on at least eight different crags, mostly rather sun-exposed, scattered over central Lakeland, and *Draba incana* also occurs sparingly in eight stations, chiefly on the eastern fells. *Dryas octopetala* was first found by James Backhouse, jun., in 1869 on Helvellyn. It still grows in very small quantity on a crag of the Helvellyn range and a single good clump was found on the Scafell range by the writer in 1957. *Ajuga pyramidalis* is even more impressive in its rarity, a robust cluster being known from just a single ledge in the High Street Range, where it has hung on since its discovery by Backhouse 90 years ago. None of these four species belongs to particularly high altitudes, for all their localities lie between 1,000 and 2,500 ft.

By contrast, several other calcicoles appear to owe their rarity at least partly to their requirement for high elevations, for most of their localities lie above 2,300 ft. Their chief, or only, stations are accordingly on the Helvellyn Range. This group includes *Saxifraga nivalis, Cerastium alpinum, Salix lapponum, Carex atrata, Poa alpina, P. balfourii, Phleum alpinum, Euphrasia frigida, Veronica serpyllifolia* subsp. *humifusa* and *Cystopteris montana*. The habitats of these plants differ in detail, but all occur on north to east facing rocks or broken slopes, and very sparingly. (I have not seen the last five and am judging by the records.) *Poa glauca* has been seen on Helvellyn only at about 2,800 ft., but has a better colony at 2,000 ft. on the Coniston Fells. *Thlaspi alpestre* would appear to be confined to a similar altitude on Helvellyn, where it is very scarce, but the Fusedale record probably refers to a lower level. *Polygonum viviparum,* a strangely rare plant in Lakeland, might be placed in the same group, for it is known only from a few places on Helvellyn and on Bowfell, all above 1,800 ft., though on limestone near Shap it descends well below 1,000 ft. This plant grows on rather wet, bare ledges and in the richer grasslands adjoining the cliffs or on exposed summit slopes.

The remaining three species of the present group all have a curiously restricted and discontinuous distribution in Britain. *Sedium villosum* has a very few Lakeland stations, mostly in wet, basic flushes at moderate elevations in the eastern half of the district. Another Pennine plant, *Potentilla fruticosa,* was discovered on Helvellyn by James Backhouse, jun., but has evidently not been seen there since. It still grows very locally on the shaded crags of Wasdale Screes and the Pillar, on moist ledges, in rock crevices and sometimes in tall herbaceous communities. The growth is not nearly as luxuriant as on the banks of the Tees, but there are some good clumps.

Woodsia ilvensis was found in several places, chiefly on the eastern fells, by Victorian fern-hunters, but its present status is obscure. At least one colony still survives in the District, and may well be the finest remaining in Britain. The growth varies from one year to another and is evidently best during a wet summer, when many fronds reach 7 ins. in length. There are about a hundred plants, and during a favourable season, one clump, with over a hundred fronds, has a diameter of 10 ins. or more. The habitat consists of dry, earthy and moderately basic rocks with a very sparse plant growth otherwise. The recorded stations of *Woodsia ilvensis* are evidently all above 1,500 ft., but probably do not exceed 2,500 ft. There are compelling reasons why no locality can be given for the described colony.

(b) TOLERANT SPECIES

The remainder of the mountain flora consists of plants which grow on both calcareous and non-calcareous materials, and those which are confined to the latter.

The most famous of Lakeland plants, *Lychnis alpina,* may be put in the first group. Long known from Hobcarton Crags in the Grassmoor group, this species grows on dry, acidic Skiddaw Slates on the sun-exposed walls of gullies at 2,000-2,300 ft. The other reported station on the Coniston Fells has never, to my knowledge, been re-discovered. *L. alpina* still adorns the rocks of Hobcarton, though the many pilgrims have taken a toll, and the best clumps are now mostly in awkward places. Over 130 plants were counted recently, at the height of the flowering time, but the total population probably does not exceed 150 individual clumps. The blooms vary from white to the predominant deep pink, and the growth is much more luxuriant than in the Clova station. Its associates are such commonplace taxa as *Vaccinium vitis-idaea, Cryptogramma crispa, Solidago virgaurea* and *Festuca vivipara.*

Raven and Walters (1956) have described the Hobcarton habitat of the plant, and their evidence suggests a connection between its presence here and an unusual quality of the rock, notably the occurrence of a vein with pyrites. Other botanists had suggested previously that *Lychnis alpina* has an unusual mineral requirement, but magnesium was mentioned as the critical ion. The plant grows on serpentine in Clova, and Fernald (1907) believed it to belong essentially to the flora of magnesium-rich rocks (including serpentine) in the New England mountains. Knaben (1950) says it grows on nearly all serpentine outcrops in Norway.

Pyrites is widespread in Lakeland and characteristically associated with other minerals in veins, so it seemed possible that more than one ion might be in abnormally high concentration. Samples of the soil on which *L. alpina* was actually growing, and from the crumbling banks below an unusually rotten, yellowish-brown seam of rock in the middle of the main colony, were analysed in an attempt to discover any peculiar chemical properties. The analyses (Table 2) disclose that two samples, especially B, are rich in manganese, which is the predominant exchangeable cation. Soil B also has more available iron than is usual, but iron-bearing rocks are so widespread in the district that this cannot be regarded as a distinctive feature. The usually predominant ion, calcium, and to a lesser degree, magnesium, sodium and potassium, are all in low concentration, and there may well be significance in the relatively high proportion of manganese rather than in the absolute amount. The pH values are fairly low and soil chemists have shown that manganese is more readily available in acidic than basic soils.

It is interesting that *Grimmia atrata,* a moss said to be particularly associated with copper-bearing rocks (Martensson and Berggren, 1954), grows abundantly with *Lychnis alpina* on Hobcarton Crags. In two samples copper is the predominant cation after manganese, but is only in average concentration compared with most soils: sample No. 6 from Helvellyn shows a larger amount. It is, however, rather suggestive that this rare moss grows on at least two copper seams in the Coniston Fells, where the other *L. alpina* station lies. Perhaps magnesium, copper, manganese, iron and even other metals are mutually replaceable as critical ions in the physiology of these plants. Again, it could be that the relatively high combined concentration of manganese, iron and copper is the decisive factor concerned in the occurrence of *L. alpina* at Hobcarton Crags. Pigott (1958) has, however, pointed out that the pyritic rocks favoured by "copper-mosses" in this country give soils rich in sulphate. No analyses of this anion were made for the Hobcarton samples, but the pH values do not show the high acidity usually associated with high concentration of sulphate.

Though *Alchemilla alpina* is so plentiful on basic rocks, it is best included in the present group, since it flourishes also on relatively base-deficient soils. A plant of wide tolerances, it is surprisingly little affected by sheep-grazing. Whilst growing in the utmost profusion on many of the high crags, it is no less abundant on some grassy slopes and soily screes, often at much lower levels. Though the second most plentiful mountain plant in Lakeland, *A. alpina* has a patchy and, at first sight, rather puzzling distribution. It grows abundantly on Dove Crags, Grasmoor, but is otherwise very scarce on the Skiddaw Slate, and though common on many of the Borrowdale Volcanic fells, it is noticeably sparse in some parts, such as Langdale and Eskdale.

The distribution of this plant is to be explained largely by its soil requirements, though its absence from apparently suitable substrata remains mysterious. *A. alpina* is not completely acid-tolerant in Lakeland, though many of its soils are base-poor by agricultural standards. It appears to avoid acidic "mor" soils and to favour either skeletal types in which podsolisation is resisted to some extent by steepness of the ground or frost action, or those which are periodically enriched by flushing during wet weather. From these rather low nutrient levels, the plant grows successfully as base-status increases to saturation point. The need for something better than the poorest soils probably explains its general absence from the Skiddaw Slate, Buttermere syenite and Eskdale granite, as the soils derived from these parent materials are usually more mineral-deficient than those formed from the Borrowdale Volcanic rocks.

This point is nicely shown in the Newlands Valley, where the dividing line between the last Series of rocks and the Skiddaw Slate runs obliquely up the slope of Eel Crags, with the Borrowdale Volcanic uppermost. *A. alpina* is abundant on the last parent material, but occurs on the Skiddaw Slate only where this receives at least intermittent drainage from the igneous rocks above. The soils derived from the Slate are evidently too poor normally to support the plant. Again, Robinson above Buttermere is a Skiddaw Slate hill but has some rather calcareous patches of this rock in one place. *A. alpina* is abundant on these lime-bearing outcrops, but quite absent from the acidic rocks which form the bulk of the mountain. Some of the hard, flinty volcanic ashes of the Borrowdale Series likewise yield soils of nutrient value too low for *A. alpina*. Within Lakeland, this plant may thus be used, to some extent, as an indicator of the better mountain soils.

Salix herbacea and *Carex bigelowii* often grow together, and occur in all the major fell groups, though the latter is the more plentiful and widely distributed. Both belong to the *Rhacomitrium* heath of high summits and spurs, and are almost the only mountain plants of the barren, stony and windswept summits, where they occur in extreme dwarf form on the poorest of soils. They are, however, equally typical of elevated cliffs, both acidic and basic, and attain a relatively luxuriant growth on the sheltered rock ledges. *Carex bigelowii* grows successfully in closed grass and dwarf shrub communities, and in shallow, high-level bogs, down to 1,800 ft., whereas *Salix herbacea* is confined to more open, drier soils, and has not been seen below 2,150 ft.

Saxifraga stellaris is a common plant of the damper soils, usually with a rather low nutrient content, and is one of the few mountain species to occur plentifully on the Skiddaw Slate. Moist rocks, stream-sides, small rills, flushes and springs are its chief habitats, but it grows sparingly on exposed, rather dry, summits and screes. Fine, robust clumps occur in many damp, shaded rock crevices, and it is sometimes associated with others of its genus on the more basic rocks. Hawkweeds are abundant on some of the high-lying cliffs, and could form the subject of a separate account, but the distinctive *Hieracium holosericeum* deserves special mention. A true montane plant, this species is rare and confined to crags at over 2,000 ft. on several widely separated hills. It needs very open, dry rock ledges, and often grows on exposed faces with only the very sparsest accumulation of soil in tiny crevices. Whilst it would seem to flourish in habitats which are acidic and base-deficient, the parent rock is not necessarily the poorest. *Antennaria dioica* and *Orthilia secunda* are best included under tolerant species, since their substrata vary from moderately acidic to decidedly basic. *Antennaria dioica* is rather local, growing occasionally in grassy and heathy pastures, but most finely and abundantly on base-rich rocks at moderate elevations, as on the crags above Honister. *Orthilia secunda* occurs over the rather narrow range of altitude from about 1,000 to 1,700 ft. and is not a plant of high levels. Its habitat is usually the dry crevices of shattered rocks in damp places, such as gullies and ravines, in Borrowdale, the Vale of Legburthwaite and Mardale.

The trio of coastal species, *Silene maritima, Armeria maritima* and *Plantago maritima* all qualify for inclusion in the mountain flora, and belong to the present ecological group. The first is the most widespread and abundant, ranging from river and lake-side shingle to high-lying screes and cliffs at 2,600 ft., on markedly acidic to slightly basic materials. It grows very finely on certain crags of the Scafell Range. Whereas this species favours the drier rocks, *Armeria maritima* grows usually on rather moist, shaded crags and has not been seen below 2,300 ft. It occurs sparingly on several hills, on rocks slightly enriched by flushing. *Plantago maritima* is abundant on rather moist, basic ledges of Honister Crag, but grows by sandy tracks in Ennerdale.

(c) CALCIFUGES

Last are those plants which belong mainly to acidic heath or bog communities. *Arctostaphylos uva-ursi* and *Empetrum hermaphroditum* have scattered localities, mainly on fairly stable screes and broken cliffs. Both grow on fairly dry, acidic soils with a "mor" surface humus, but the former is mainly a plant of moderate elevations (below 2,000 ft.) and belongs to open Callunetum, whereas the latter grows chiefly above 2,000 ft. and is associated more with *Vaccinium* spp. *Empetrum hermaphroditum* does, however, grow well on the screes of Riggindale Cove at only 1,200 ft. Both plants are likely to have been eliminated from many former localities by fire and sheep, but their absence from many suitable and undisturbed cliff ledges cannot be thus explained. *Arctostaphylos uva-ursi* still grows abundantly on the rocky western slope of Grasmoor, its trailing mats there mixed with heather and juniper, forming a community similar to that widespread in parts of the Highlands.

Vaccinium uliginosum, a frequent plant of montane heaths and bogs in Scotland, is recorded only from Grisedale Pike, High Street and Great Mell Fell in Lakeland. Probably all these localities lie above 1,500 ft., but this species occurs in a number of places just beyond Lakeland, in peat-mosses and moors at surprisingly low levels: near Carlisle it descends to below 100 ft. The dwarf form of juniper, *Juniperus communis* subsp. *nana,* grows on cliffs and broken ground on several hills, mostly above 1,500 ft., but is linked by intermediate forms to the ordinary shrub which produces thickets on many lower hillsides. *J. communis* subsp. *nana* is not merely the montane habitat form of *J. communis,* for equally stunted plants, still clearly nearer to the latter, commonly occur in exactly the same kind of place as the true dwarf, and even alongside it, up to fully 2,500 ft. The high-level juniper populations are evidently mixed and there is a taxonomic and ecological problem to be solved.

Lycopodium annotinum has scattered localities along the Langdale slopes of the Bow Fell range, mainly in rather damp, rocky grassland, but is unknown elsewhere in Lakeland. The three other club-mosses, *L. selago, L. alpinum* and *L. clavatum* are all widespread and often common—typically in dry, acidic grassland —and frequently grow in close association. All descend to very low levels, but whereas the other two reach the highest tops, *L. clavatum* seldom occurs much above 2,000 ft.: they are less strictly montane than *L. annotinum.* Though so common on Pennine moors, *Rubus chamaemorus* is rare in Lakeland, its few stations being high on the fells in the eastern half of the region—the Skiddaw Group, Matterdale Common and the High Street Range. Here it grows sparsely in the shallow *Eriophorum* blanket-bogs, hardly below 2,000 ft., and flowers sparingly or not at all.

The remaining calcifuge, *Cryptogramma crispa,* has strong claims to rank as a mountain plant, though its distribution extends to low levels. Famous as a scree pioneer, it is present everywhere in this rôle, from the base to the summits of the hills. Some earthy screes are smothered with a profusion of *C. crispa* and *Alchemilla alpina* but support few other vascular plants. Rock ledges and crevices are another habitat, but there the Parsley Fern does not luxuriate as on the loose talus slopes below. It is often plentiful in dry *Festuca-Agrostis* grassland, especially on rocky slopes with patches of scree, and such a community is sometimes seral. Occurring as it does on all the acidic rocks of the region, this is the most widely distributed of all the Lakeland mountain plants, and nowhere in Britain does it grow more finely.

PLANT COMMUNITIES

Some Lakeland mountain plants grow on more or less bare rocks with little or no other vegetation, but others belong to distinctive cliff-ledge communities which, though small in area, are relatively constant in composition from one site to another. On basic rocks the character of these "hanging gardens" is given not only by the mountain element, but also by the accompanying and equally constant assemblage of plants which are better known in lowland woods and damp meadows, or along moist roadside verges, in northern Britain. The two groups together form a tall herbaceous growth similar to the communities of subalpine birch and willow scrub in the mountains of Scandinavia. This type of vegetation is best developed on calcareous crags with large, stable and damp ledges, as on Honister Crag about the old quarry workings, and on some rich cliffs at higher levels. It is strikingly represented in an elevated gully of Blea Water Crags, above Mardale. A middle section of this gully has broad, gradually inclined sides, but steep rocks on all approaches bar access to sheep and deer. The bed of the cleft and its broken sides are smothered in a rank growth of tall herbs, giving some indication of the vegetation natural to these moist, base-rich soils before the advent of hill-farming (soil analysis, Table 2, No. 6).

Mountain plants are not particularly well represented at this station, however, and for ledges rich in these species, the Helvellyn range is the best place. The following list, drawn from a series of north-east and east facing cliffs at 2,600-2,800 ft. on Helvellyn, gives some idea of the vegetation on the bigger ledges with a well developed layer of mull-humus soil. It is a composite list, though a few ledges have most of the species named.

Alchemilla alpina	f.
A. glabra	a.
Anemone nemorosa	f.
Angelica sylvestris	f.
Cochlearia alpina	f.
Crepis paludosa	a.
Deschampsia cespitosa	a.
Festuca rubra	a.
F. vivipara	a.
Filipendula ulmaria	a.
Galium boreale	l.
Geranium sylvaticum	f.
Geum rivale	a.
Heracleum sphondylium	f.
Lathyrus montanus	o.
Luzula sylvatica	a.
Oxyria digyna	f.
Ranunculus acris	f.
Rhinanthus minor	o.
Rubus saxatilis	o.
Rumex acetosa	f.
Saussurea alpina	f.
Saxifraga hypnoides	a.
Sedum rosea	a.

Solidago virgaurea	a.	*Mnium hornum*	a.
Succisa pratensis	f.	*M. punctatum*	f.
Taraxacum officinale	f.	*M. undulatum*	a.
Thalictrum minus	f.	*Philonotis fontana*	f.
Trollius europaeus	l.	*Plagiothecium denticulatum*	f.
Valeriana officinalis	o.	*Polytrichum alpinum*	f.
Atrichum undulatum	o.	*Pseudoscleropodium purum*	o.
Brachythecium rutabulum	f.	*Rhacomitrium lanuginosum*	a.
Breutelia chrysocoma	f.	*Rhytidiadelphus loreus*	a.
Campylium protensum	o.	*R. squarrosus*	a.
Ctenidium molluscum	a.	*Sphagnum plumulosum*	f.
Dicranum majus	f.	*S. subsecundum*	f.
D. scoparium	a.	var. *auriculatum*	
Drepanocladus uncinatus	o.	*Thuidium tamariscinum*	a.
Eurhynchium praelongum	f.	*Lophocolea bidentata*	a.
Hylocomium splendens	a.	*Tritomaria quinquedentata*	f.
Hypnum cupressiforme	a.	*Plagiochila asplenioides*	o.

Similar ledges elsewhere on the fell have *Chamaenerion angustifolium* and *Silene dioica.* Elsewhere in Lakeland, rarer members of such a community include *Potentilla fruticosa, Cirsium heterophyllum, Vicia sylvatica, Aquilegia vulgaris* and *Rosa pimpinellifolia,* whilst at lower levels *Vicia sepium, Trifolium medium, Centaurea nigra* and *Epilobium montanum* are added to the list. In the Highlands, *Salix lapponum* often grows in tall herb communities, but the survivors on Helvellyn occupy rather bare rocks.

Whilst all the species listed above may grow in more open and unstable rock habitats, a characteristic assortment of mountain plants and lowland associates belongs solely to such places, though its members commonly inhabit the less crowded edges of ledges covered with tall herbs. The list below was compiled for the same range of Helvellyn crags and refers to the more specialised calcareous rock habitats, such as small ledges, pockets, crevices and steep slabs—all those places where gravity keeps soil development to its earliest stages. It does not represent a community in the usual sense, but merely a group of species kept in association by a common need for a more or less basic substratum and relative freedom from competition. In Lakeland, a few of these plants always grow in intimate contact with the rock surface and some of the mosses are strictly rupestral. Whereas the herbaceous ledge vegetation is usually associated with rather moist conditions, the open rock-face habitats vary greatly in wetness, and on sun-exposed cliffs may be very dry.

Alchemilla alpina	a.	*C. flacca*	f.
A. wichurae	f.	*C. panicea*	a.
Asplenium viride	o.	*C. pulicaris*	a.
Campanula rotundifolia	f.	*Cerastium alpinum*	r.
Carex atrata	r.	*C. holosteoides*	f.
C. demissa	f.	*Cystopteris fragilis*	a.

Euphrasia rivularis	f.
Festuca rubra	a.
F. vivipara	a.
Hieracium spp.	
esp. *H. anglicum*	f.
Juncus triglumis	o.
Linum catharticum	f.
Minuartia verna	f.
Poa alpina	o.
Polystichum lonchitis	r.
Potentilla crantzii	r.
Saxifraga aizoides	f.
S. hypnoides	a.
S. nivalis	r.
S. oppositifolia	f. -a.
S. stellaris	f.
Selaginella selaginoides	a.
Silene acaulis	f.
Thalictrum alpinum	f.
Thlaspi alpestre	r.
Thymus drucei	a.
Amphidium lapponicum	r.
A. mougeotii	a.
Anoectangium compactum	a.
Anomobryum filiforme	f.
Bartramia ithyphylla	o.
B. pomiformis	o.
and var. *crispa*	o.
Brachythecium plumosum	f.
Bryum pseudotriquetrum	a.
Campylium stellatum	f.
Cratoneuron commutatum	f.
C. filicinum	f.
Ctenidium molluscum	a.
Distichium capillaceum	o.
Ditrichum flexicaule	f.
Encalypta ciliata	o.
Fissidens adianthoides	f.
F. cristatus	f.
F. osmundoides	f.
Grimmia apocarpa	a.
G. funalis	o.
G. torquata	f.
Hypnum callichroum	o.
H. hamulosum	o.
Isopterygium pulchellum	f.
Mnium marginatum	f.
M. orthorrhynchum	r.
Neckera crispa	f.
Orthothecium intricatum	o.
Plagiobryum zierii	f.
Plagiopus oederi	o.
Rhacomitrium ellipticum	r.
Tortella tortuosa	f.
Riccardia pinguis	a.
Frullania tamarisci	f.
Tritomaria quinquedentata	f.
Preissia quadrata	f.

(Soil analysis. Table 2, No. 4.)

Various other basic cliffs of the Helvellyn range provide such notable additions to this list as *Dryas octopetala, Draba incana, Polygonum viviparum, Poa glauca, P. balfourii, Antennaria dioica, Armeria maritima, Orthilia secunda* and *Anthyllis vulneraria*; on other hills *Ajuga pyramidalis* and *Plantago maritima* belong to a similar variety of open rock habitats. The basic cliffs of Helvellyn and other high fells commonly have *Salix herbacea* and *Carex bigelowii,* but these are equally typical of acidic rocks and soils. Sudden changes in edaphic conditions account for the abundance of common calcifuges on the rich cliffs, but at least some of these plants appear to tolerate basic soils. Most of these species typical of acidic rocks, particularly the bryophytes, have been omitted from the above lists.

Calcareous flushes on the slopes have a distinctive type of vegetation. Such places appear as small, bare stony patches of ground, with water trickling over the muddy soil, which usually has a very open plant growth. An example on the north face of

Catchedicam is listed below; it contains species of the rock ledges which are unaffected by sheep-grazing.

Cardamine pratensis	o.	*Selaginella selaginoides*	o.
Carex demissa	a.	*Thalictrum alpinum*	f.
C. panicea	f.	*Viola palustris*	o.
C. pulicaris	a.	*Acrocladium sarmentosum*	o.
Cerastium holosteoides	o.	*Blindia acuta*	a.
Cochlearia alpina	f.	*Bryum pseudotriquetrum*	f.
Deschampsia cespitosa	f.	*Campylium stellatum*	f.
Euphrasia rivularis	f.	*Cratoneuron commutatum*	f.
Festuca rubra	a.	*Ctenidium molluscum*	f.
Juncus triglumis	f.	*Drepanocladus revolvens*	a.
Pinguicula vulgaris	f.	*Fissidens adianthoides*	f.
Ranunculus acris	f.	*Philonotis fontana*	a.
Saxifraga aizoides	a.	*Riccardia pinguis*	f.
S. oppositifolia	o.	*Scapania undulata*	a.
S. stellaris	f.		

Sedum villosum grows in similar flushes elsewhere on the Helvellyn range. On the slopes of High White Stones, more strongly calcareous flushes have a more luxuriant growth of mosses such as *Cratoneuron commutatum* and *Ctenidium,* and contain *Meesia uliginosa,* though they are less rich in mountain plants.

Springs situated high in the coves of Helvellyn are fed by rather poorer water and typically show an abundance of bryophytes, as in a list from Brown Cove.

Agrostis canina	f.	*Sagina procumbens*	o.
Cardamine pratensis	f.	*Saxifraga hypnoides*	a.
Cerastium holosteoides	f.	*S. stellaris*	a.
Chrysosplenium oppositifolium	ld.	*Stellaria alsine*	a.
Cochlearia alpina	a.	*Brachythecium rivulare*	a.
Deschampsia cespitosa	f.	*Bryum weigelii*	o.
Epilobium alsinifolium	f.	*Dicranella squarrosa*	f.
Festuca rubra	f.	*Mnium punctatum*	f.
Poa annua	o.	*Philonotis fontana*	a.
P. trivialis	f.	*Pohlia albicans* var. *glacialis*	o.
Rumex acetosa	f.	*Aplozia cordifolia*	f.
		Scapania undulata	a.

To these are added the following in Nethermost Cove.

Agrostis stolonifera	a.	*Sphagnum squarrosum*	o.
Ranunculus acris	o.	*S. subsecundum* var. *auriculatum*	f.
Bryum pseudotriquetrum	f.	*Chiloscyphus polyanthus*	f.
Drepanocladus exannulatus	f.	*Pellia epiphylla*	f.

Two plants recorded from this area (the first not seen recently), *Phleum alpinum* and *Veronica serpyllifolia* subsp. *humifusa,* grow in very similar spring communities in the Highlands. Such springs grade into richer flushes below, whilst in wet gullies they are often bounded by banks of *Saxifraga hypnoides.* (Soil analysis. Table 2, No. 5.)

Even on basic soils the grasslands are not usually rich in mountain species, but on many Borrowdale Volcanic hills, the *Festuca-Agrostis* pastures which receive intermittent irrigation with mineral-charged water are densely grown with carpets of *Alchemilla alpina.* The best example of an "alpine grassland" occurs very locally at about 2,500 ft. on Helvellyn, where normally dry slopes are flushed in places from calcareous rocks during wet weather. The sward has some affinity with the wetter flushes, but is characterised by the following.

Achillea millefolium
Agrostis tenuis
Alchemilla glabra
Anthoxanthum odoratum
Campanula rotundifolia
Festuca ovina
F. rubra
Geum rivale
Thymus drucei
Viola riviniana
Ctenidium molluscum

Mountain species occurring in varying quantity are

Alchemilla alpina	f.	*S. hypnoides*	a.
Cochlearia alpina	a.	*S. oppositifolia*	o.
Galium boreale	o.	*S. stellaris*	a.
Juncus triglumis	o.	*Thalictrum alpinum*	a.
Minuartia verna	f.	*Viola lutea*	f.
Polygonum viviparum	f.	*Oncophorus virens*	r.
Saxifraga aizoides	o.		

All these species except *Oncophorus virens* grow more abundantly or more luxuriantly on rock ledges above.

Analyses of soil samples taken from these various eutrophic habitats are given in Table 2.

The calcifuge communities of the Lake Fells are poor in mountain plants, and since mention has been made of the vegetation types in which each species occurs there is no need for complete lists. These communities are adequately described elsewhere, e.g. Pearsall (1950): they range from the predominant acidic grasslands (the dry *Festuca-Agrostis* to the wet *Nardus-Juncus squarrosus* types) to *Calluna* and *Vaccinium myrtillus* heaths, *Calluna-Eriophorum* bog and *Rhacomitrium* heath.

Northern Plants

In addition to the mountain species, there are plants with a widespread distribution in the northern half of Britain, both on the low ground—sometimes away from the hills—and on the mountains. Some of these have been mentioned in the account of the crag-ledge "communities", as for instance, *Trollius europaeus, Geranium sylvaticum* and *Cirsium heterophyllum.*

Others are more definitely restricted to the lower slopes of the hills, the mountain valleys or the foothill country, and are scarce or absent in the northern lowlands: these may be described as sub-montane, but the group as a whole is here termed "northern".

Primula farinosa is widespread and locally plentiful in the eastern half of Lakeland, chiefly in the dales of the High Street range, but within the fell country does not occur west of a line from St. John's Vale to Tilberthwaite. Drainage and heavy grazing have evidently reduced in extent the particular kind of calcareous marshy ground which it favours, but its frequent companions, *Parnassia palustris* and *Selaginella selaginoides,* are less exacting in their needs and more widely distributed over the district. The Grass of Parnassus appears in open communities on basic ledges on some of the high cliffs, though flushes and marshes on the slopes are its more usual place. It has a rather patchy distribution, whereas *S. selaginoides* is almost ubiquitous wherever wet, basic soils occur. Another much rarer plant of calcareous flushes, *Equisetum variegatum,* has been found only in Wasdale. *Sorbus rupicola* and*Dryopteris villarii* are notable and locally abundant plants of the limestone tract bordering the district to the south-east but very rare in Lakeland itself. The Rock Whitebeam has three good colonies on strongly calcareous rocks in Borrowdale and St. John's Vale, but *Dryopteris villarii* is known only from Honister Crag. Mr. F. Jackson has found two young clumps of this fern on rocks recently exposed by quarrying, and believes there is a parent colony, perhaps in an unapproachable part of the great precipice.

Asplenium septentrionale has a good many sites, well scattered over the district, but its hybrid, *A.* × *alternifolium,* is very rare and in small amount on only three or four crags. Whilst these ferns may well have a special mineral requirement (Raven and Walters, 1956), the Forked Spleenwort, at least, grows on markedly base-poor rocks of both the Skiddaw Slate and Borrowdale Igneous Series. *Cystopteris fragilis,* by contrast, is decidedly calcicole and may be found on nearly all the basic crags of the region, at all altitudes.

Among the plants characteristic of rocky mountain woods are *Melampyrum sylvaticum, Ciraea alpina, Impatiens noli-tangere, Melica nutans* and *Festuca altissima.* The first is recorded from a few woods, mainly in Borrowdale, presumably on acidie humus soils, whereas the rest are confined to fairly basic substrata. *Circaea alpina* and *Impatiens noli-tangere* grow as members of herbaceous communities on moist "mull" soils in mixed deciduous woods, with the former widespread and reaching 1,500 ft. on shaded cliff ledges. The Yellow Balsam is exclusively lowland and much rarer, its main localities being in the Windermere district, around Derwentwater and in the Duddon Valley. This is one of the distinguished plants of the district, for only here and in North Wales is it truly native in Britain. The two grasses are more or less confined to rocks, especially those in damp ravines. *Vicia orobus* has been recorded from woods near Ullswater, and grows very sparingly on cliff ledges in Wasdale and in fell meadows in Eskdale. *Salix phylicifolia* has scattered localities at low levels but ascends to the cliffs of Helvellyn at over 2,000 ft.

Two species belong mainly to the sub-montane pastures. *Meum athamanticum* formerly grew in a few places, but now appears to be extinct in Lakeland. *Viola lutea* (the blue-flowered form), on the other hand, is plentiful in some places, chiefly in dry grassland on moderately basic soils, but grows on a few of the higher crags.

Among the plants of acidic humus soils, *Listera cordata* is rather rare, on damp heathy slopes, and *Trientalis europaea* has been found only in Eskdale. The spongy *Sphagnum* bogs of the valleys and gently contoured hills produce a few species of note. *Carex paupercula* grows in a few swamps of this kind, and has *C. limosa* for company near Matterdale and on the Watendlath fells, whilst *C. pauciflora* is plentiful on parts of the Watendlath and Eskdale moors. *Drosera anglica* and *Hammarbya paludosa* occur in scattered places only, but *Vaccinium oxycoccos* is a widespread and usual species of these wet bogs. *Andromeda polifolia* is very local in Lakeland itself, in contrast to its abundance on the peat-mosses of the adjoining lowlands, but grows up to at least 1,500 ft. on the blanket bogs above Watendlath.

The more distinctly aquatic habitats have several species which belong chiefly to hill districts in Britain. *Juncus filiformis* and *Carex aquatilis* are plants of lake and stream-side respectively; the former known from several of the larger lakes. *Isoetes lacustris* is mostly a plant of the bigger lakes and *Subularia aquatica* favours the smaller, higher-lying tarns, whilst *Lobelia dortmanna* is equally typical of both kinds of place.

THE RELICT NATURE OF THE MOUNTAIN FLORA

Though the mountain flora of Lakeland is relict as a whole, there are all degrees of "relictness" and the distribution patterns of the various species differ widely. First, there is the group of species, including both calcicoles and calcifuges, which occurs in most places where conditions are suitable. Discontinuities in the distribution of these plants are therefore to be explained by the obvious barriers of unsuitable habitats. The occasional absence of species such as *Sedum rosea, Alchemilla alpina* and *Salix herbacea* from likely places would best be attributed to the element of chance which must always affect plant distribution, especially where migration is concerned. The limitations imposed by an obvious lack of suitable edaphic habitats and by biotic effects are here discounted; the present purpose is to examine the distribution of species which are often absent from apparently suitable places.

Palaeo-ecologists stress the importance of "historical factors" in the present distribution of plants, especially relict species. Included under this head are the effects of climatic changes following the end of the latest glaciation, involving the large-scale migration of types of vegetation and inevitably causing the disappearance of species from large areas where they were once common. When this effect is less extreme, plants survive but with a relict distribution, their few remaining localities being widely and often irregularly scattered: some species may be in the last stages of a retreat which will lead eventually to their extinction.

The history of the Late-glacial flora as drawn by Godwin (1949, 1956) shows that most of the montane plants of Lakeland must be regarded as relicts of a much colder climate, and they are restricted to the altitudinal zone where comparable conditions yet prevail. Even so, at the Post-glacial Climatic Optimum, the lower limit to this favourable temperature zone must have been at least several hundred feet higher than at present. With the fall in temperature during the Sub-atlantic Period, some of the montane plants may, in theory, have been able to descend slightly. It is likely, however, that some plants which *could* grow under the present cooler conditions near the tops of our highest hills were eliminated completely at the Climatic Optimum. Equally, though, others managed to hang on here and there at high levels during this time, yet they may have been unable to spread under "improved" conditions which still do not allow their ecesis. The Climatic Optimum thus seems to have been the critical period in determining the present relict distribution of many species. Though they extend to heights far beyond the tree limits, the mountain species of tall herb ledges are quite characteristic of high-level woodlands on basic soils. This group would be the least depleted by the warmer period of the Post-glacial, and, accordingly, its members are now mostly widely distributed and reach low levels. Formerly, a cover of forest and scrub extended to at least 2,000 ft.—possibly much higher—and this growth must have eradicated plants which need open habitats.

A good illustration of this point may be seen at Wolf Crags on Matterdale Common. Here, the broken and rather low-lying cliffs are strongly calcareous in places, but their mountain flora consists of only a few widespread species. One rock face at 1,600-1,700 ft. is smothered with a relict patch of scrub, including a dense growth of *Prunus padus*. Perhaps because of the shade, true mountain species are missing from this face, but there is a fairly rich herbaceous flora typical of basic woodlands at lower levels. The other faces, on which scrub growth is sparser or has disappeared, have been recolonised by those high level species which had managed to survive in the vicinity, and the woodland flora has in turn lost ground.

Even on precipitous ground, tree and scrub growth is thus quite likely to have eliminated the more exacting mountain species up to 1,700 ft., replacing them with a woodland flora; while in earlier times the effect probably extended to well over 2,000 ft. in places.

This competition effect is distinct from the direct damage some species may suffer due to increased temperatures. Within the woodland and scrub zone, these competition-intolerant plants must have become restricted—if they survived at all—to steep, rocky ground where trees could grow only sparsely. Only above the tree-limit are there likely to have been many suitable refuges for such species: the great screes of the present day would not then be available as they are mostly recent features, caused by human abuse of the land.

The present patchy distribution of species such as *Saxifraga oppositifolia, Silene acaulis, Thalictrum alpinum, Polystichum lonchitis, Saussurea alpina* and *Juncus triglumis* may therefore be explained by their disappearance from hills which were not sufficiently high or rugged to give refuges from either the warmer climate or the blanket of trees at the Climatic Optimum. Even if the need for altitude or an open habitat were satisfied, calcareous substrata were also a prime requirement. The plants of the above list occur mostly on the massifs which possess the combination of high altitude and calcareous rock, though here they may occur at quite modest elevations (see Table 1, at end), suggesting downward migration as the tree-limit fell. These species are often absent from the lower hill-ranges, even though habitats suitable in soil and elevation occur now, for no favourable refuges were available at the maximum extension of the tree zone.

Some of the rare Lakeland mountain plants appear to have limited powers of spread under present conditions, though they seem able to maintain their existing populations. Some of these, such as *Dryas octopetala,* are abundant in the Highlands, and there set good seed in quantity. Others, including *Ajuga pyramidalis,* are nowhere plentiful in Britain, and their rarity may be due partly to a poor capacity for dispersal, even under optimal conditions. By contrast, some common species are certainly able to spread by seed, though their effective dispersal range may be small. Nearly all the widespread calcicoles have colonised in quantity the bare rock-faces of abandoned quarries, as on Honister Crag, Ill Bell and Erne Crag at Rydal. The newly exposed surfaces evidently have a higher lime-content than those long-weathered. The first locality provides an unusual spectacle by way of illustration, for the ruined cabins and retaining walls of the old railway so cleverly built across the great cliff are festooned with growths of *Sedum rosea, Oxyria digyna, Cochlearia alpina* and various Saxifrages and ferns. High on Helvellyn, the dump of an old lead mine is studded with clumps of Purple Saxifrage, and this plant has colonised the site of a fairly recent rock-fall on the Scafell range. In all these cases, parent populations on the adjacent rocks have supplied the seed. The mountain plants restricted to the highest levels perhaps do not set viable seed under present conditions, or it may be that their populations are too small and seed production therefore insufficient to allow spread. These are the true relicts.

Some of these rarities may still be declining in quantity. One of the Helvellyn colonies of *Salix lapponum* has a poor stunted growth, with small leaves: there are many dead twigs, and the willow has an unhealthy look compared with a few larger bushes elsewhere on the hill. It has not been rediscovered in its old locality on Catchedicam and may have died out there. Many of the plants of *Potentilla fruticosa* on Wasdale Screes show numerous dead twigs in their crowns, though often with plenty of leafy growth on the lower parts of these branches. In this case, perhaps recovery followed a severe check caused by some exceptional condition such as an unusually long drought.

Patton (1923) has made the very feasible suggestion that plant disease may well be important in deciding the survival or extinction of montane species. Such a factor is likely to be the more significant for rare species, and infection is more probable when a plant is growing under unfavourable conditions. Many chance extinctions may have come about through such an agency.

The connection between the occurrence of mountain plants and a cold climate is implicit, but Dahl (1951) has analysed this correlation in detail for Scandinavia, suggesting the possibility of critical maximum summer temperature as a limiting factor. Since the critical temperature is not the same for all species, different plants will have different lower altitudinal limits in the same district. The varying altitudinal ranges of the Lakeland species (see Table 1) may well be due to this effect, i.e., species confined to high levels cannot survive under the relatively high critical temperatures of others which extend much lower down the hillsides. The figures given may not represent a strict sequence of critical temperatures—only the general trend. The two extreme groups—those occurring below 1,000 ft. and above 2,500 ft.—certainly seem to show differentiation with regard to critical maximum summer temperature.

Many species are too rare to indicate their true lower altitudinal limits, but such boundaries are fairly well defined in plentiful plants, e.g. *Sedum rosea, Oxyria digyna, Carex bigelowii* and *Salix herbacea.* The lower limits of these four species show a gradual descent with distance north in Britain—a trend consistent with the idea of limiting temperatures, though humidity effects have not been ruled out as a possible controlling factor. Most of the mountain plants which occur below 1,000 ft. in Lakeland descend to sea-level in north-west Scotland. On the other hand, most of those confined to over 2,000 ft. in Lakeland do not descend below 1,000 ft. anywhere in the Highlands. Many of the plants listed in the upper half of Table 1 are plentiful in Scotland, and their rarity in Lakeland is probably due to the lack of cool enough summers, combined with a scarcity of suitable edaphic habitats. It is significant, too, that no species which has a lower limit of 2,500 ft. in the Highlands occurs in Lakeland. *Cystopteris montana* and *Salix lapponum* do not grow much below 2,000 ft. in Scotland, and in Lakeland have been found only above 2,500 ft.

on Helvellyn, their southernmost British station.

In contrast to the Scottish Highlands, Lakeland does not appear to have any vegetation which depends on a prolonged snow-cover during winter, and apart from one or two rare mosses such as *Dicranum starkei,* species associated with late snow-lie are absent. This is again an expression of the warmer climate.

As a point of interest, several species reach their lowest Lakeland elevation in Wasdale, but this may be due to the occurrence of suitable habitats at low levels as much as to the seaward position of the dale. *Alchemilla alpina, Saxifraga aizoides, Lycopodium alpinum* and *Cryptogramma crispa* reach the shore of Wastwater, whilst *Saxifraga oppositifolia* descends to 800 ft. on the slopes above.

Finally, although the scarcity of some species does not at first seem to be due to the lack of suitable climatic or edaphic habitats, they may have subtle special requirements. These plants are highly relict in Lakeland because their particular needs are seldom satisfied. *Lychnis alpina,* with its special mineral demands, is the outstanding example of this effect (see p. 7). In the Pennines *Thlaspi alpestre* and *Minuartia verna* are particularly associated with lead-mine refuse, and their restricted distribution in Lakeland may be due to their special soil requirements—perhaps the combination of lead and high base-status. Both grow on Helvellyn, which has lead-bearing and calcareous rocks. *Woodsia ilvensis* seems to favour an uncommon habitat, namely, dry, basic and very rotten rocks. Probably only a very few outcrops of Lakeland rock contain enough lime for *Dryas octopetala,* and both this species and *Potentilla crantzii* have a predilection for dry and often sun-exposed sites, whereas most high-lying calcareous rocks in the district are rather moist and shaded.

Scattered distributions of the above kind present, to some extent, an inscrutable problem, for one usually has to explain not so much why a plant grows where it does as why it is missing from other places which are apparently equally suitable. When all the obvious possibilities have been explored, the distribution of some plants remains inadequately explained. Species nearly always have a scattered distribution at the limits of their range, which over long periods is necessarily mobile—either extending or retreating. It follows that the flora of any district must have a number of rarities, since conditions are usually marginal for some species. The relative slowness with which most plants appear or disappear under gradually changing conditions ensures that only a proportion of the available habitats holds any species at its limits of range, but the actual places where the plant becomes established, or survives, depend largely on chance.

A COMPARISON WITH OTHER DISTRICTS

The nearest floristically-rich hills to Lakeland are the Northern Pennines, chiefly the districts of Upper Teesdale—Crossfell and Craven. The two regions have a good deal in common, for out of the 59 mountain species named for Lakeland, 41 occur in the Northern Pennines, and in the latter there are no more than 17 mountain plants which do not grow in the former. Both contain the only stations for *Potentilla fruticosa* on the British mainland; *Myosotis brevifolia* is known elsewhere only from the Moffat Hills and N. Yorks.; and other rare or very local plants common to both are *Phleum alpinum, Saxifraga nivalis, Dryas octopetala, Potentilla crantzii, Poa alpina, Minuartia verna, Thlaspi alpestre, Sedum villosum* and *Woodsia ilvensis* (believed extinct in its only Pennine locality). From the eastern distribution in Lakeland of certain species which are, or were, more common in the Pennines, such as *Minuartia verna, Draba incana, Sedum villosum, Polystichum lonchitis, Rubus chamaemorus* and *Primula farinosa,* it is tempting to suggest an eastern migration of part of the mountain flora into the first region.

The absence from the Northern Pennines of *Alchemilla alpina* and *Oxyria digyna* is remarkable, considering their abundance in Lakeland. It may be that the migrating periglacial flora was heterogeneous in composition in Northern England, lacking certain species locally, so that these two plants failed to reach the first region during the period when conditions for their spread were suitable. *Saussurea alpina* and *Silene acaulis* are two other surprising absentees from the Northern Pennines and it is equally unexpected that the Purple Saxifrage should be missing from the Teesdale area. Though its habitats are widespread in both, *Empetrum hermaphroditum* has a relict distribution in Lakeland and is completely absent from the Pennines.

In ecological character the two districts have much less in common, and Lakeland has no counterpart to Upper Teesdale, either in extent and type of calcareous habitats or in the number of exclusive rarities which it harbours.

Another adjacent area with a rich mountain flora, the Moffat Hills in Dumfriesshire, has 38 of the 59 Lakeland species and 7 others besides. Here again, *Alchemilla alpina* is absent and there is only a doubtful record of *Saxifraga aizoides,* a very plentiful Lakeland plant. The most southerly recorded stations in Britain for *Salix myrsinites* and *Carex vaginata* lie in this district. Formerly, the Moffat Hills were evidently the British headquarters of *Woodsia ilvensis,* and though collecting exterminated the fern in its best known localities, at least one respectable colony survives.

The absence of *Alchemilla alpina* and *Saxifraga aizoides* from Snowdonia is noteworthy, for this region shares 42 mountain species with Lakeland and claims only eight not in the northern district. The two areas are very similar in climate, topography and geology, but the great calcareous cliffs of Snowdon and the Glyders have a much more profuse and varied growth of plants than the best Lakeland crags. Lakeland rarities such as *Saxifraga nivalis, Dryas octopetala, Polystichum lonchitis, Carex atrata, Poa alpina* and *P. glauca* all grow more abundantly, though still

TABLE 1

DISTRIBUTION OF MONTANE PLANTS IN LAKELAND AND OTHER MOUNTAIN REGIONS

Lower Limit (ft.)	Species	1 Helvellyn	2 Fairfield	3 High Street	4 Scafell	5 Pillar	6 Gable-Honister	7 Derwent Fells	8 Grasmoor	9 Bowfell	10 High Raise	Coniston Fells	11 Snowdonia	12 Northern Pennines	13 Moffat Hills	14 Scottish Highlands
2,500	Cerastium alpinum	+	+										+		+	+
	Cystopteris montana	+														+
	Phleum alpinum	+												+		+
	Veronica serpyllifolia subsp. humifusa	+													+	+
	Salix lapponum	+													+	+
2,000	Armeria maritima	+			+	+	+	+	+				+	+		+
	Carex atrata	+		+	?								+		+	+
	Euphrasia frigida	+													+	+
	Hieracium holosericeum	+		+	+		+				+	+	+			+
	Poa alpina	+											+	+		+
	P. balfourii	+	+	+									+	+	+	+
	P. glauca	+											+	+		+
	Polygonum viviparum	+								+		+	+	+	+	+
	Rubus chamaemorus	+		+										+	+	+
	Salix herbacea	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	Saxifraga nivalis	+		+	+								+	+	+	+
	Lychnis alpina								+			+				+
1,500	Ajuga pyramidalis			+											+	+
	Carex bigelowii	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	Draba incana	+	+	+								+	+	+		+
	Dryas octopetala	+			+								+	+		+
	Juncus triglumis	+	+	+	+								+	+		+
	Juniperus communis subsp. nana	+			+	+	+		+			+	+			+
	Minuartia verna	+	+	+									+	+		+
	Polystichum lonchitis	+	+	+									+	+	+	+
	Potentilla fruticosa	+			+	+								+		
	Saussurea alpina	+	+		+	+	+			+	+		+		+	+
	Silene acaulis	+	+	+	+								+			+
	Vaccinium uliginosum			+					+					+	+	+
	Woodsia ilvensis	+	+	+	+								+	+	+	+
1,000	Alchemilla wichurae	+	+	+	+	+	+	+						+	+	+
	Arctostaphylos uva-ursi			+	+	+			+		+			+	+	+
	Empetrum hermaphroditum	+	+	+	+								+		+	+
	Euphrasia rivularis	+			+	+		+					+			
	Lycopodium annotinum									+						+
	Orthilia secunda	+		+				+			+			+	+	+
	Potentilla crantzii	+	+		+			+			+		+	+	+	+
	Sedum villosum	+		+							+			+	+	+
	Thalictrum alpinum	+	+	+	+	+	+			+			+	+	+	+
	Thlaspi alpestre	+		+									+	+		+
500	Antennaria dioica	+	+	+	+	+	+	+			+		+	+	+	+
	Asplenium viride	+	+	+	+	+	+	+		+	+	+	+	+	+	+
	Epilobium alsinifolium	+	+	+	+	+	+	+			+		+	+	+	+
	Myosotis brevifolia	+	+	+							+			+	+	
	Oxyria digyna	+	+	+	+	+	+	+		+	+	+	+		+	+
	Saxifraga oppositifolia	+	+	+	+					+	+		+	+	+	+
	Sedum rosea	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
−500	Alchemilla alpina	+	+	+	+	+	+	+	+	+	+	+				+
	Cochlearia alpina	+	+	+	+	+	+	+		+	+	+	+	+	+	+
	Cryptogramma crispa	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	Galium boreale	+	+	+	+	+	+	+		+	+	+	+	+	+	+
	Lycopodium alpinum	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	L. clavatum	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	L. selago	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	Plantago maritima			+			+						+	+		+
	Rubus saxatilis	+	+	+	+	+	+	+			+	+	+	+	+	+
	Saxifraga aizoides	+	+	+	+	+	+	+	+	+	+	+		+		+
	S. stellaris	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
	Silene maritima	+	+	+	+			+	+	+	+	+	+		+	+
	Thalictrum minus	+	+	+	+	+	+	+		+	+	+	+	+	+	+
		54	34	42	36	26	25	24	16	21	27	22	42	42	40	57
		60											8	17	7	65 othe

very locally, on the Welsh hills. The difference is clearly due to the greater extent of suitable edaphic habitats in Snowdonia, for this district as a whole seems to have lost more of its original Late-glacial flora than has Lakeland—probably due to the slightly warmer climate. Helvellyn now has a greater number of mountain species than Snowdon, irrespective of their abundance. Snowdonia is the poorer region of the two in calcifuges, lacking *Rubus chamaemorus, Vaccinium uliginosum, Arctostaphylos uva-ursi* and *Lycopodium annotinum* (believed present once but now extinct). Five species common to Snowdonia and the Highlands, *Cerastium nigrescens, Cardaminopsis petraea, Deschampsia alpina, Saxifraga cespitosa* and *Woodsia alpina,* show an extra large disjunction in that they are missing from northern England and southern Scotland.

Some parts of the Scottish Highlands have an incomparably greater wealth of mountain plants than any of these more southern regions, and as a whole have no fewer than 65 species which do not grow in the Lake District. There is strong similarity, however, between Lakeland and some less rich districts of the southern and western Highlands, though the former lacks such widespread Scottish plants as *Gnaphalium supinum, Sibbaldia procumbens, Loiseleuria procumbens, Luzula spicata* and *Juncus trifidus. Potentilla fruticosa, Myosotis brevifolia* and *Euphrasia rivularis* are the only Lakeland species not found in the Highlands, and of the rest, only *Woodsia ilvensis, Lychnis alpina, Minuartia verna, Thalictrum minus, Saxifraga hypnoides, Silene maritima, Cryptogramma crispa* and the three common clubmosses do not grow more finely or abundantly in the Highlands.

Quaternary studies have established (see Godwin, 1956) that many British mountain plants occurred in Full-glacial and Late-glacial times far to the south of their present range. For instance, though now confined to the Scottish Highlands, *Betula nana* once occurred in Cumberland and Westmorland (D. Walker in *op. cit.*). Some of the floristic diversity between the various mountain regions in Britain is thus explained by the disappearance of species during the Post-glacial Period. This explanation cannot, however, justifiably be extended to cover *all* regional diversity in flora when the direct supporting evidence is lacking. There are, for instance, no grounds for assuming that *Alchemilla alpina* was ever present in the Pennines or North Wales during the Late or Post-glacial Periods, unless remains of this species can be found in either district. Strangely, despite the impressive body of information collected, British Quaternary studies have thrown very little light on the history of the species which are now most prominent in the Lakeland mountain flora.

As a final note it should be pointed out that some of the species mentioned are so rare that any collecting at all would create a serious threat to their chances of future survival. The danger is the greater in these days of easy access to the hills.

Table 2

EXCHANGE IONS AS MG./100 GM. SOIL

EXCH. IONS AS MG./100 GM. SOIL

Locality	% loss on ignition	pH	Na	K	Ca	Mg	Fe	Mn	P_2O_5
1. Hobcarton Crag A	15·0	4·4	3·3	8·0	6·6	2·4	2·4	10·4	3·5
2. Hobcarton Crag B	6·8	4·0	1·4	5·6	3·5	0·3	7·7	21·4	0·2
3. Hobcarton Crag C	4·7	5·2	2·2	6·6	6·8	2·1	0·5	2·5	0·3
4. Nethermost Cove, Helvellyn A	20·3	6·1	6·7	15·4	295·6	34·3	0·3	—	0·9
5. Nethermost Cove, Helvellyn B	17·0	5·8	4·7	9·9	99·7	7·9	—	6·9	0·8
6. Blea Water Crags	19·4	5·5	4·9	21·2	185·0	14·6	—	—	0·3
7. Wasdale Screes	—	6·27	—	7·06	264·4	—	—	—	10·2
8. Piers Gill, Scafell Pike	—	6·52	—	3·3	175·1	—	—	—	3·7
9. Brown Cove, Helvellyn	—	7·51	—	2·9	730·4	—	—	—	2·7

NOTES ON SOILS AND VEGETATION:

1. Dark brown friable loam in pockets and niches of rock face with *Lychnis alpina*.
2. Crumbling bank of raw ochreous mineral soil freshly disintegrated from rock face in *Lychnis alpina* gully.
3. Decomposed clayey seam in disintegrating rock face of *Lychnis alpina* gully.
4. Dark brown silty loam with mull humus, from rich chomophytic vegetation on steep calcareous rock face (locality list on p. 13).
5. Dark brown silty loam with mull humus from strongly irrigated banks with *Saxifraga hypnoides* and *Chrysosplenium oppositifolium*.
6. Dark brown silty loam with mull humus from ungrazed tall herb community on broad ledge of calcareous cliffs.
7. Red-brown silty loam from crumbling sides of gully occupying a shatter belt strongly charged with calcite and ferric oxide. *Saxifraga oppositifolia*, *S. hypnoides*, *S. aizoides*.
8. As in 7. *Saxifraga oppositifolia* and calcicolous mosses.
9. Finely comminuted debris of old lead-mine dump: a raw, unleached deposit evidently containing a large amount of calcite. Thickly colonised by *Saxifraga oppositifolia*.

I am very grateful to Miss M. C. Gray, The Nature Conservancy, for providing the soil data for samples 1-6. Mrs. V. Jones, University College of North Wales, carried out the analyses of samples 7-9, and she and Professor P. W. Richards have kindly allowed me to reproduce these data from their Biological Flora account of *Saxifraga oppositifolia* (*J. Ecol.*, **44**: 300-316) (1956).

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THE DISTRIBUTION AND ECOLOGY OF ARUM NEGLECTUM IN SOUTHERN ENGLAND AND WALES

By C. T. PRIME, O. BUCKLE and J. D. LOVIS

Part II.—DORSET, DEVON, CORNWALL, ISLES OF SCILLY, CHANNEL ISLANDS and WALES

The distribution of *Arum neglectum* (Townsend) Ridl. and *A. italicum* Mill. in the south-west of England does not present quite so simple a picture as that in Sussex and Hants. In fact, careful study of plants from Cornwall, the Channel Islands and Portland, Dorset makes it clear that the two taxa are not specifically distinct. This is also confirmed by observations on the Continent, and taxonomic revision is contemplated (Prime, *unpubl.*). For the purposes of this paper, however, the two names will still be used, to conform with current usage.

Since the first part of this account was written (Prime, Buckle and Lovis, 1955) considerable colonies of *A. neglectum* and *A. italicum* have been rediscovered at Portland, Dorset*. The plants are to be found in the hedges, under the protection of brambles, within the small walled fields (called "closes"), and also along the balks which mark the remains of an early mediæval field system. In fact, in some places, where cultivation has been discontinued owing to the increase of quarrying, it is possible to trace the original boundaries by the presence of the plants. *Arum* species were, at one time, used for their corms, and an early account quoted by Warren (1940), suggests that the plants were cultivated, though other accounts do not mention this. Whatever the truth of this, the plant has been in Portland for a long time. It is hoped to give elsewhere a fuller account of the early uses of the plants.

DEVON (Vice-counties 3 and 4)

The earliest record of *A. neglectum* for Devon is from Fursdon, Egg Buckland, the home of T. R. Archer Briggs, who wrote (1888): "When first I found the plant here at Fursdon I quite expected to meet it elsewhere in the country around, but having failed to do so, now suspect that it has become wild in the immediate vicinity of this house through early cultivation in proximity to an ancient dwelling, the meadow below here, close to which the plant occurs, still bearing the name of Undertown". The plant still survives in the wild garden, under the partial shade of an oak, in a rather acid soil of pH 5·5, and it very probably owes its survival to the cutting and clearing of the undergrowth at intervals.

Many of the remaining records cited by Martin and Fraser (1939) are open to doubt. Those from Braunton may be in error,

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*Some of these colonies were previously known to Mr. A. W. Graveson.

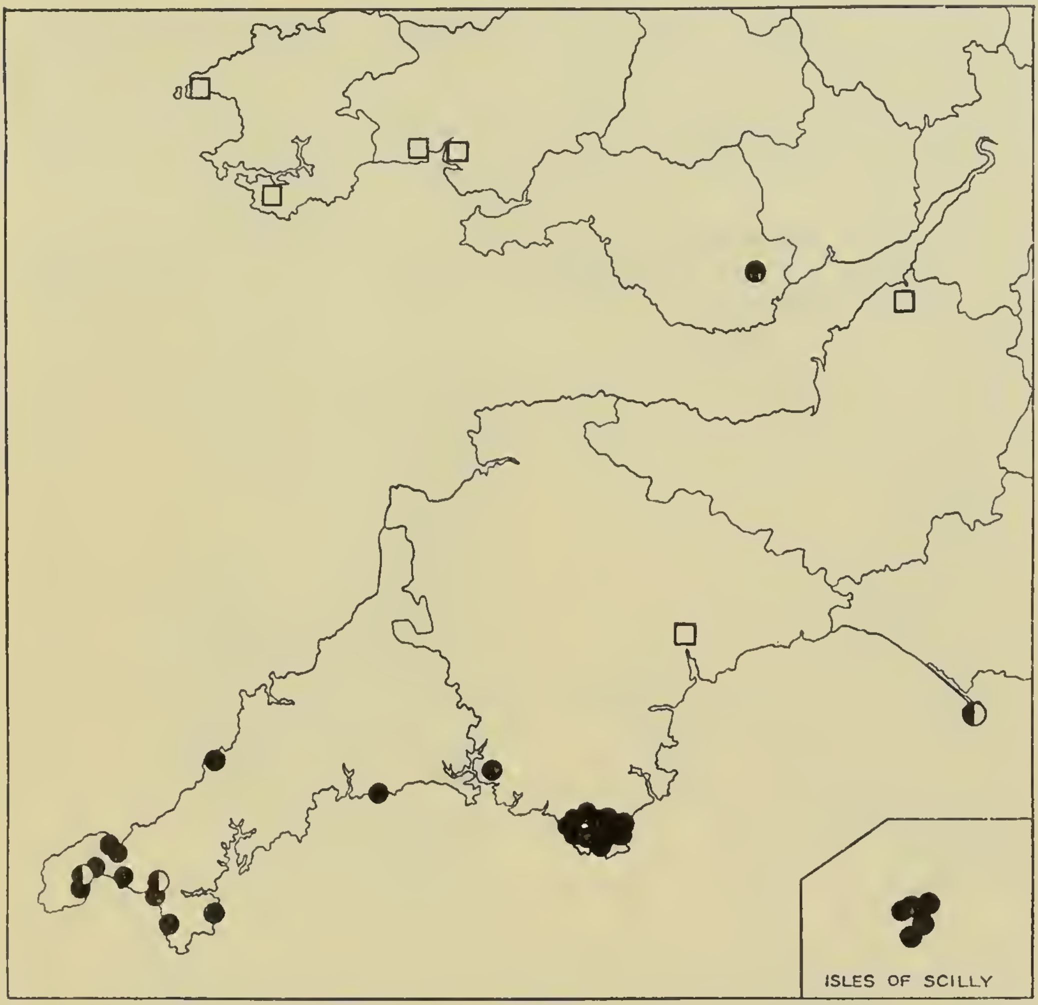

Fig. 1. The distribution of *Arum italicum* and *A. neglectum* in south-western England, Wales, and the Isles of Scilly. The black circles indicate *A. neglectum*, the squares naturalised colonies of *A. italicum*, and the black and white circles native populations including *A. italicum*, *A. neglectum*, and intermediate forms.

for one of us (C. T. Prime) searched the areas in this district with Dr. F. R. Elliston Wright in 1951 without success. The herbarium specimens of F. Wyatt from Salcombe Regis are *A. maculatum* and search in the district has failed to show any trace of *A. neglectum.* Sidbury, near Sidford, is a locality attested by G. T. Harris in 1920, but the plant has not been reported since. The "landslip, just over the Devon border from Lyme Regis" record, first reported by H. N. Ridley and W. Fawcett in 1885 (specimen in Hb. Mus. Brit.), is another locality not recently confirmed*. The Dawlish records dated 1910 are again errors of identification, and Dr. H. Gilbert-Carter informs us that *A. neglectum* does not

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*N. M. Pritchard has recently recorded *A. neglectum* from the Rousdon landslip, near Rousdon. This is not the same station as that recorded by Ridley and Fawcett.

occur in the neighbourhood. The Torquay specimens were suspect from the beginning (cf. Martin and Fraser, 1939), and there is no recent record from the district. The Dartmouth specimen is a very doubtful record, especially as the sheet contains a note dated 28 May 1925 saying "all the leaves were old and yellowish"—a time when the plant might be expected to be in good flower.

In South Devon *A. neglectum* is undoubtedly native and may be seen in a number of localities (Fig. 1), all near Kingsbridge. A list is given below:—

Bagton
Baston
Batson
Beeson
Bolberry
Buckland
Burleigh
Charleton
Chillington
Churchstow
Combe, nr. South Pool (3 sites)
Dunstone (2 sites)
East Portlemouth (2 sites)
Galhampton
Galmpton (2 sites)
Gerston
Goveton
Horswell (2 sites)
Inner Hope (2 sites)
Ilbertsow
Kellaton (2 sites)
Kingsbridge
Scoble
Sherford
South Huish (3 sites)
South Pool (2 sites)
South Milton (4 sites)
Stokenham
Sutton, nr. S. Milton
Thurlestone (2 sites)
Upton
West Alington
Woolston (3 sites)

The association of the plant with habitations is striking, and although the sunken lanes of the villages provide shelter, the association suggests an old medicinal use, possibly parallel to that of Portland. In these habitats, too, the soils have been enriched by cultivation. Such is the case at Hope where the soil is derived from underlying river-gravel, and at Bolberry where the soil is derived from hornblende schist. The main sites are derived from rocks of the Meadfoot series, and the plant is noticeably absent from Prawle, where the underlying rock is chiefly mica and quartz.

The sites are usually in light shade, often under *Acer pseudoplatanus* and *Rubus* species, with the following as frequent associates:—*Brachypodium sylvaticum, Eupatorium cannabinum, Galium aparine, Hedera helix, Mercurialis perennis, Phyllitis scolopendrium, Rumex crispus, Silene dioica, Smyrnium olusatrum, Taraxacum officinale, Urtica dioica* and *Veronica chamaedrys.*

All the plants of these Devon localities are typically *A. neglectum,* and show little, if any, trace of the marbled-white venation of *A. italicum.*

CORNWALL (Vice-counties 1 and 2).

A. neglectum was recorded from cliffs west of Polperro by W. B. C. Perrycoste (in Thurston and Vigurs, 1922). It is confined to areas which are probably enriched by the drainage water from the higher parts of the cliffs. Although in a more exposed site than some of those in South Devon, the plant is protected by nearby *Rubus* species and *Sambucus nigra*. The soil is rather acid (pH 5·5) but the associated flora includes usual associates like *Urtica dioica* and *Hedera helix*.

Ralfs (Davey, 1909) first recorded the plant from the more western part of Cornwall in 1877, and in the region of Penzance it is not uncommon. In those parts both *A. italicum, A. neglectum* and intermediate forms grow together and it is impossible to maintain the specific distinction. The following list shows where the plants have recently been seen, and the accompanying names and dates give the earliest records for these localities.

Carbis Bay, *Davey, 1909*
Gulval, *Davey, 1909*
Copse near Heamoor
Roadside, Heamoor
Streamside, Heamoor
Quarry, Helston, *J. Cunnack, 1883*
Roadside, Lelant, *Davey, 1909*
Lelant village, *J. Ralfs*, cited by *Davey, 1909*
Antoine Terrace, Newlyn
Penrose Wood, near Helston, *J. Cunnack*, cited by *Davey, 1909*
Love Lane and Creepy Lane, Penzance, *W. Curnow* and *J. Ralfs, 1878*
Newlyn Road, Penzance
Sithney Green
Treago Farm, near Crantock, *C. C. Vigurs, 1907*
Trereife, *J. Ralfs*, cited by *Davey, 1909*
Trevowah, near Crantock, *C. C. Vigurs, 1907*
Perran Downs Hedge and quarry floor, Porth Mellin, near Mullion, *D. E. Coombe*, conf. *C.T.P. & O.B.*
St. Keverne, *C.T.P. & O.B.*

A colony of *A. italicum* at Perranuthnoe originated as an escape from cultivation. *A. neglectum* has been recorded from Ponsanooth (Davey, 1909), but the specimens are of an *A. italicum* leaf-form (Hb. S.L.B.I.); the plant has now disappeared from this locality, possibly owing to extensive road widening. *A. neglectum* was collected at Bude by Thurston (Hb. Kew), but has not been refound by any of the writers, nor has it been seen at Kennack Sands or the Lizard, where all the plants appear to be *A. maculatum*. Other localities where the plant has not been seen recently are Gwinear Road Station, Phillack Church and north of the Gunnel at Newquay.

A. neglectum avoids granite, partly because of the acid soils the rock carries, and partly also because the toughness of the granite makes for a bleak topography which does not provide the shelter so necessary for the plant.

The occurrence of *A. neglectum* in regions where the soils are base-rich is again to be noted. It is absent from the Land's End peninsula, but present near Crantock on the narrow limestone bands of the Meadfoot series.

The common associates of the plant are much as in Devon, but others noted include *Umbilicus rupestris, Petasites fragrans, Vinca major* and *Rubia peregrina.* Many of the sites were near running water, a feature previously noted, and nearly all were in some shade. This is likely to be correlated with protection from summer sun. The chromosome number of plants from Newlyn and Love Lane, Penzance, has been determined as $2n=84$.

Isles of Scilly†

A. neglectum holds its own in these islands, being recorded from all five inhabited islands of the group (St. Mary's, St Agnes, Tresco, Bryher and St. Martin's), and occurs very locally on two of the uninhabited islands (Samson and St. Helen's). It grows mainly in hedgebanks, and on roadsides, in light shade with many typical associates. Occasionally it occurs in a *Pteridium-Rubus-Endymion* tangle, the bracken growing to a height of about 18″, which may indicate a soil containing a little more raw humus than usual, but the pH in this particular example was 6·7. Except in most sheltered spots, the plant does not show the luxuriance of the plants of the mainland. *A. maculatum* does not occur in the islands.

Channel Islands (Vice-county O)

A. neglectum grows in a number of localities in Guernsey (Fig. 2), but *A. italicum* does not occur. The principal sites are:—

Water Lanes, Moulin Huet Bay, St. Martins
Near junction of Rue du Tertre and Talbots Road
By Niaux Mill in Talbots Road
North side of Talbots Road
Cobo Church
Garden of house in Cambridge Road, St. Peter Port

Older stations not rediscovered are:—

Fermain Bay
Kingsmill and Rue des Bergers

All the sites were deep, well-drained and base-rich. They are derived from a fine ochreous clay which, in the south, overlies the decomposed gneiss. The sites are mostly shaded, and often associated with a running water supply, as for example Water Lanes, Niaux Mill. Some of the colonies are large, amounting to over 1,000 plants, and have been known since the 1870's (Marquand, 1901). The associated plants are similar to those listed for south-western England.

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† The authors are indebted to Mr. J. E. Lousley for this account.

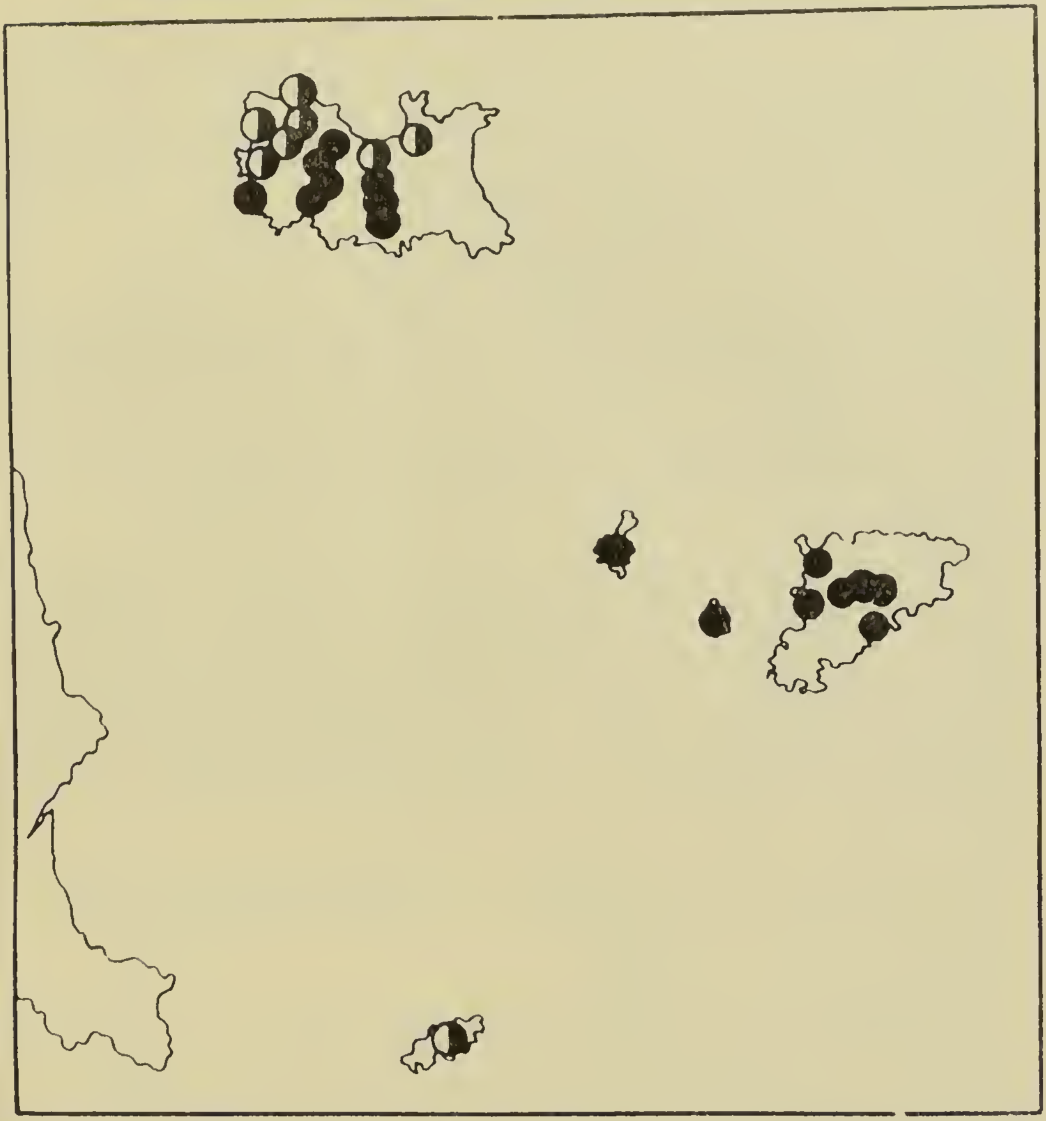

Fig. 2. The distribution of *Arum italicum* and *A. neglectum* in the Channel Islands. The black circles indicate *A. neglectum*, and the black and white circles indicate populations including *A. italicum*, *A. neglectum*, and intermediate forms.

The plant is common in Jersey (Lester-Garland, 1903) (Fig. 2); in the south-east it is abundant in the parishes of St. Clement's and parts of Grouville, and it is impossible to give a full list of stations. Some of the more important are: —

Samares
Lane leading to le Hocq
Lane leading to St. Clement's Church
Lanes near Gorez
Fliquet Bay
South of Trinity Church (Moulin de Bas)
Vaux valley to St. Helier
Millbrook and Waterworks valley
Rozel Bay
St. Aubyn's

The last is the most westerly record for the taxon in Jersey, excepting a site at L'Etac which has been destroyed. Populations can be found in which plants show every intermediate form from extreme *A. italicum* to extreme *A. neglectum*, and as one proceeds in a westerly direction, the tendency is for the *A. italicum* forms to decrease. The associates are as elsewhere, and there is always a certain amount of light shade. In general, excepting the recent coastal sands, there is no geological stratum in Jersey which does not support the plant, but the solid geology is largely overlaid with a rock rubble and a brownish-yellow clay in which calcareous concretions occur. Two further points may be borne in mind; first, the considerable depths of soil which occur over the island's surface associated with its intensive cultivation, and second, the milder climate, which allows the plant a wider margin of soil tolerance.

A colony of plants ranging from *A. italicum* to *A. neglectum* is known from the Terrace, St. Anne's, Alderney, where it was recorded by Jackson and Shaw (1937). The site is near the diorite and porphyry outcrop. These igneous rocks decompose and are overlain by a good black soil about 18″ deep which occasionally lessens to 6″. This soil is practically neutral (pH = 6·5) and contains a little calcium carbonate, fine silt and clay.

A. neglectum also occurs on Herm (Mrs. F. le Sueur, *in litt.*, 1957) and on Sark in one locality in a small wood by a stream.

GLAMORGAN (Vice-county 41)

South Wales provides the northernmost locality (Cwm George) for *A. neglectum* in the British Isles. Here, it grows in a sheltered situation in association with a rich limestone flora. This locality was first recorded by Miss E. Vachell in 1935, and is all the more remarkable in view of its isolation from the remainder.

The cultivated taxon *A. italicum* is found as an escape at Ferryside and Laugharne in Carmarthen, and at Orielton and St David's in Pembroke.

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REPORT ON THE SURVEY OF ARCTIUM L. AGG. IN BRITAIN, 1959

By FRANKLYN PERRING

INTRODUCTION

During the last few years it had become apparent to the Maps Scheme that records of *Arctium* species received were not entirely satisfactory. There appeared to be two main sources of confusion.

1 NOMENCLATURE. *Arctium lappa* is a name which has been used to cover all Arctiums in the British flora and this use has persisted. However, *Arctium lappa* L. is undoubtedly a good species which can be recognised by its solid petioles, and *very large* (over 4 cms. when mature) heads. Careful sorting of data received, eliminating all records for this species when recorded in the absence of other Arctiums (it is apparently the least common), leads to the suggestion that this species is confined to the area south and east of a line joining the Vale of York to the Gower Peninsula in Britain, and to a few scattered localities in south and east Ireland. This impression has been confirmed by herbarium material so far investigated and by Dr. W. A. Sledge (personal communication).

I would be pleased to see any material of this species, but particularly from localities outside the range mentioned above.

2. TAXONOMY. Few people seem to have been able to distinguish satisfactorily between *Arctium nemorosum* Lejeune (*A. vulgare* auct.) and *A. minus* Bernh. The extremes are obvious enough with large and small heads respectively; and it was generally agreed that *A. minus* was rarer in the north. However, there were many intermediate cases where a decision was difficult. For this reason, Professor A. R. Clapham and Dr. C. D. Pigott made some preliminary measurements of wild populations which suggested that the two species graded imperceptibly into each other.

With the idea of getting further data we asked members of the Society to make measurements of mature *Arctium* heads anywhere in the British Isles during the late summer of 1959. Considering the details which were asked for (60 measurements of each population) the results were very encouraging—79 sets of measurements were received, including 3 of *A. lappa*.

The measurements asked for from 20 mature heads were: —

(a). Length of longest achene.
(b). Width of orifice.
(c). Total width (including involucral bracts).

It soon became clear that (a) and (b) were of little immediate value. The length of the mature achenes is remarkably constant, both within and between populations. The average mean of the five longest was generally 6·5 to 7·0 mm. Orifice width on the other hand is too variable within the population to be a satisfactory measurement, at least for a survey of this kind—slight differences in age affecting the value greatly. Thus the only results of the survey presented here are based upon the mean maximum overall head widths.

RESULTS

Although measurements of 20 head widths were sometimes received, experience suggested that to measure as many would not always be possible: in the field it was easier to select the 5 largest heads. So these results are based on the mean widths of the 5 largest heads either selected from measurements of a greater number, or from the 5 largest selected from the population in the field. All measured heads had mature achenes.

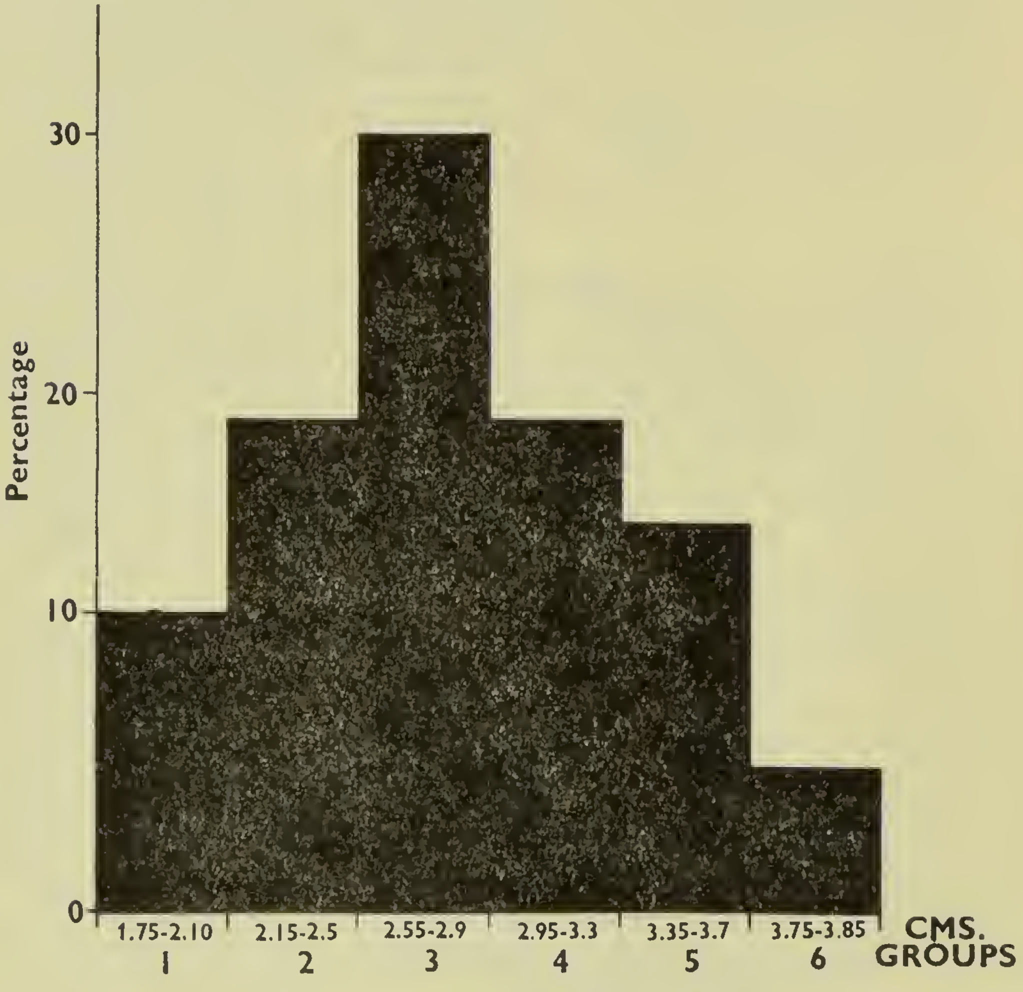

FIG. 1

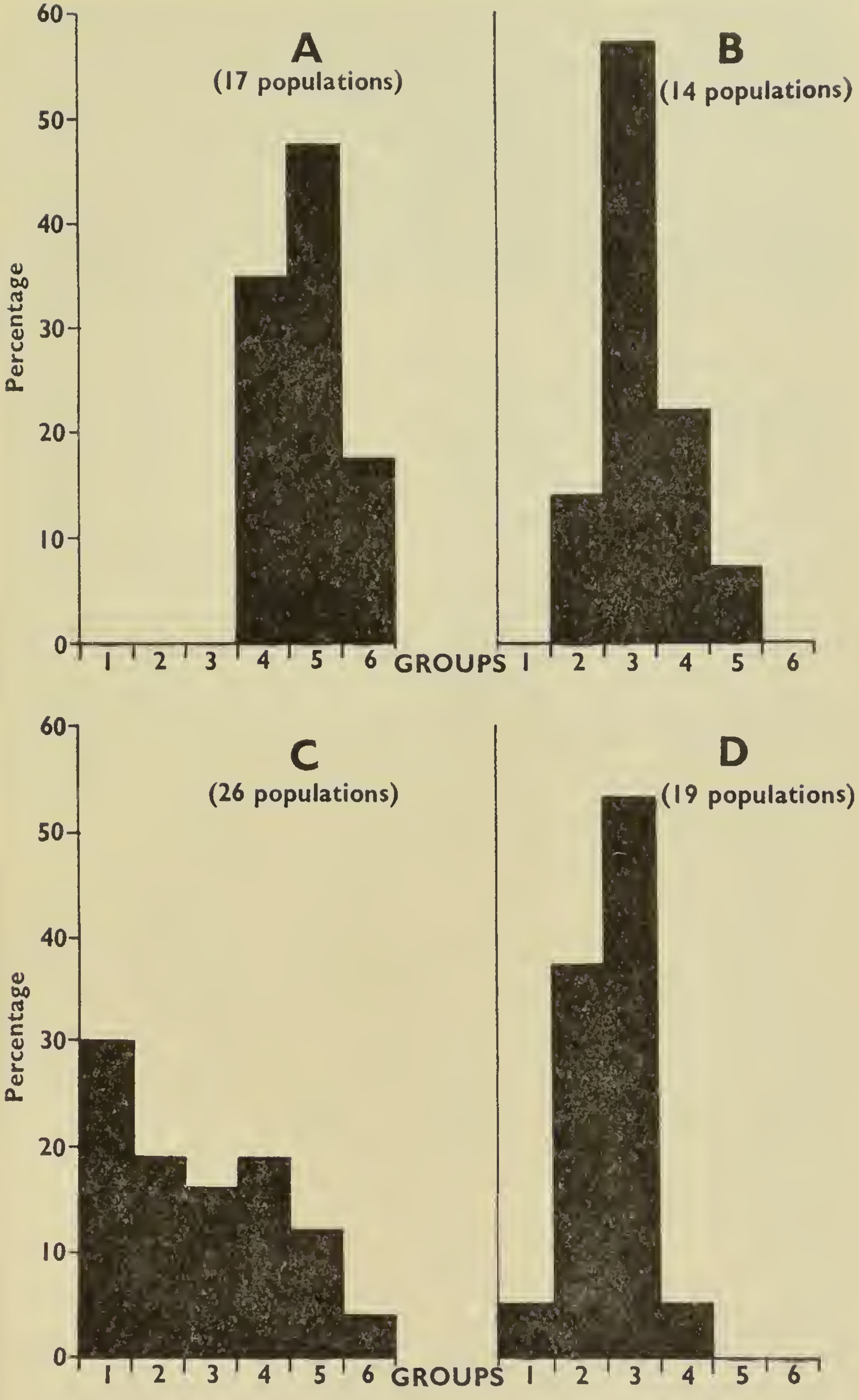
A
(17 populations)
B
(14 populations)
C
(26 populations)
D
(19 populations)
Percentage
Percentage
60
50
40
30
20
10
0
60
50
40
30
20
10
0
1
2
3
4
5
6
GROUPS
1
2
3
4
5
6
1
2
3
4
5
6
GROUPS
1
2
3
4
5
6

FIG. 2

The distribution of mean maximum head width of the 76 *Arctium* agg. populations measured (Fig. 1) shows that they varied in width from 1·75 to 3·85 cms. but that this variation is continuous and that the greatest number are intermediate in size. This situation suggests that *either* this is one very variable species, *or* this represents a hybrid swarm between two (or more) species and that the intermediates are, in general, more widespread than the parents, *or* head width is a bad diagnostic character despite the fact that it is given first place in many keys. And if this is no good, what is? Clapham and Pigott have tried others without success.

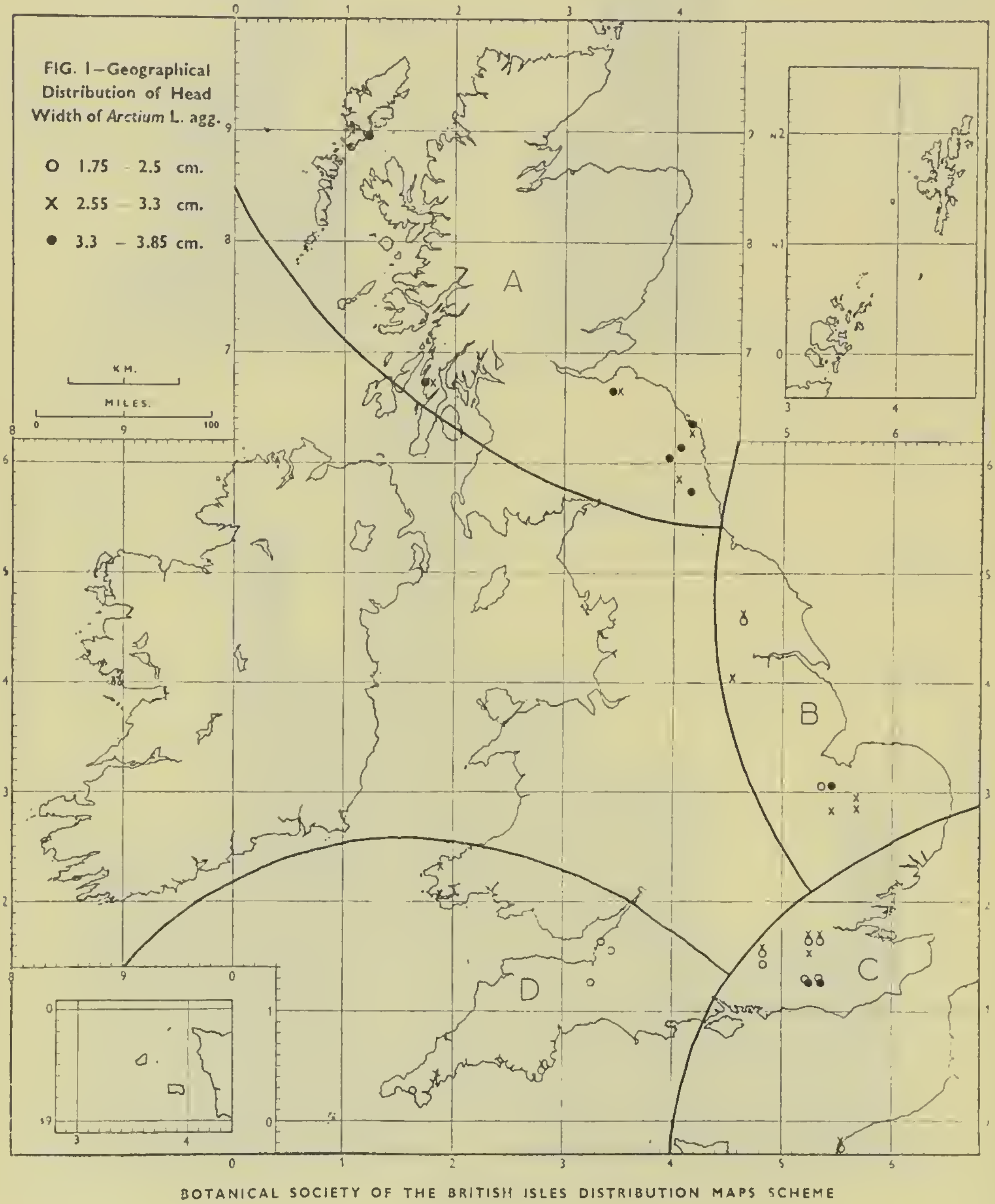
FIG. 1—Geographical Distribution of Head Width of *Arctium* L. agg.
O 1.75 - 2.5 cm.
X 2.55 — 3.3 cm.
● 3.3 - 3.85 cm.
KM.
MILES.
0
9
100
A
B
C
D
BOTANICAL SOCIETY OF THE BRITISH ISLES DISTRIBUTION MAPS SCHEME

FIG. 3

Support for the theory of a hybrid swarm may perhaps come from a closer study of the distribution of head size by regions (Figs. 2 and 3). In Scotland (A) no head width below 3·0 mm. has been recorded. In the south-west of England and South Wales (D) no head width greater than 3·3 mm. has been found—in fact in measuring 17 populations in Scotland and 19 in the south-west there is only one case of overlap—could it be that in these areas we have something resembling the pure forms of *A. vulgare* and *A. minus*? In south-east England (C) and the Midlands (B) the populations are very mixed but with a predominance of small headed forms in the south-east and a majority of intermediates in the Midlands.

Now, of course, this is a great deal of wild speculation on a minimal amount of data—what is the situation in the west Midlands, Wales and Ireland? Well, perhaps this summer more members of the society will join in the survey. After the experiences of 1959 we can streamline the effort in 1960. All we ask for this year is a complete *Individual Record Card* with all the usual details plus, in the space marked STATUS, 5 measurements of the maximum width of the largest heads from *one Arctium*. Please confine your operations to September and early October and, if you are only working in one 10 km. square, select plants in as wide a range of habitats as possible. If you can send a packet of seed along with your individual card, so much the better.

I would like to take this opportunity of thanking all those who helped in the survey during 1959; first volunteers are always most important.

FURTHER NOTES ON THE FLORA OF FAIR ISLE (V.c. 112)

By ANDREW CURRIE

I visited Fair Isle for a fortnight during May/June 1954, and again for a week during July 1957. A large amount of material was collected, and detailed notes were made on plant distribution within the island. The following notes are arranged in three sections:—

(1) New records.
(2) Confirmatory records, suggested by Fitter (1959) in his final list of 25 plants recorded on the authority of Mrs. Stout alone.
(3) Plants recorded by Trail (1906) but not by Pritchard (1957) or Fitter (1959).

Unless otherwise stated, the records are my own, and the specimens on which they are based are in my private herbarium. For convenience, I have adapted some of my data so that the localities are comparable with those marked on the map published by Pritchard (1957). The nomenclature and order is that of Dandy (1958).

1. NEW RECORDS.

PICEA SITCHENSIS (Bong.) Carriere. Introduced in Vaadal, Davis, 1958.

SILENE ACAULIS (L.) Jacq. Ward Hill, 550 ft.

MONTIA FONTANA subsp. VARIABILIS Walters. Slopes of Ruska Lee, det. *S. M. Walters.*

RADIOLA LINOIDES Roth. Dry patches among roadside heather, and near dykes. First recorded in Fair Isle Bird Observatory Log in 1953 by Prof. M. F. M. MEIKLEJOHN.

ACER PSEUDOPLATANUS L. Introduced in 1952 in Vaadal and the Gully.

POLYGONUM VIVIPARUM L. Quite abundant on the north summit slopes of Ward Hill.

P. CUSPIDATUM Sieb. & Zucc. Introduced in the Haa garden.

SALIX × MULTINERVIS Doell. Cliff at mouth of the Gully, det. *R. D. Meikle.* The only parent present is *S. cinerea* subsp. *atrocinerea* (Brot.) Silva & Sobrinho, which grows nearby. Meikle (*in litt.*) suggests that the other parent, *S. aurita* L., has perhaps become extinct.

TARAXACUM OFFICINALE Weber. Common in the burial ground, and occasional in the village.

LISTERA CORDATA (L.) R.Br. One specimen on the moor above N. Haven.

CAREX PILULIFERA L. Occasional species of moorland, det. *E. Nelmes.*

C. DIOICA L. Vaadal, very scarce.

2. CONFIRMATORY RECORDS.

POLYPODIUM VULGARE L. Occasional in certain gullies.

RANUNCULUS FICARIA L. Grassy slopes of the Gully. Very small plants.

VIOLA TRICOLOR L. Several in fields near the school.

SPERGULARIA MEDIA (L.) C. Presl. Ledge at foot of Cliff, Buness.

GLAUX MARITIMA L. Sea shore near S. Harbour.

3. PLANTS RECORDED BY TRAIL (1906) BUT NOT BY PRITCHARD (1957) or FITTER (1959)

SALIX HERBACEA L. Abundant down to 550 ft. on Ward Hill.

SENECIO JACOBAEA L. Recorded by Prof. M. F. M. MEIKLEJOHN in Fair Isle Bird Observatory Log in 1953, from roadside between Rock Cottage and Shirva.

LUZULA CAMPESTRIS (L.) DC. Grassy slopes near the Haa, det. *Miss J. Buchanan*, Royal Botanic Garden, Edinburgh.

CAREX BIGELOWII Torr. ex Schwein. Ward Hill, at about 550 ft., det. *S. M. Walters*.

In conclusion I should like to draw attention to the boreal species in the Fair Isle flora. The addition of 5 such species in this present paper brings the total to 18. The geographical groups, based on lists by Matthews (1953), are represented as follows.

NORTHERN MONTANE ELEMENT

Antennaria dioica, Listera cordata, Trientalis europaea.

OCEANIC NORTHERN ELEMENT

Armeria maritima, Atriplex glabriuscula, Cochlearia danica, C. officinalis, Honkenya peploides, Narthecium ossifragum, Silene maritima, Thymus drucei.

ARCTIC-SUBARCTIC ELEMENT

Ligusticum scoticum.

ARCTIC-ALPINE ELEMENT

Carex bigelowii, Empetrum nigrum, Polygonum viviparum, Salix herbacea, Sedum rosea, Silene acaulis.

If the vascular flora of Fair Isle is taken as being just over 200 species, this northern element represents about 9% of the total.

I am indebted to Miss J. Buchanan, Mr. R. D. Meikle, the late Mr. E. Nelmes and Dr. S. M. Walters for the identification of specimens.

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PLANT NOTES

30/T. **Tsuga heterophylla** (Raf.) Sarg. 1898, *Silva N. Amer.*, **12**, 73; *Pinus canadensis* sensu Bong., 1833, in *Mém. Acad. Sci. St. Petersb.*, **2**, 163, non L., 1767; *Abies heterophylla* Raf., 1830, *Med. Fl.*, **2**, 182. 5, S. Som.; Smith's Combe, East Quantoxhead, regenerating vigorously in plantation, A. D. & O. M. Hallam (1959, *Proc. Som. Arch. & N.H.S.*, **103**, 95). 16, W. Kent; Kilndown Wood, near Goudhurst, two small saplings, 1960, F. Rose and C. A. Stace, conf. J. Lewis. Tree to 70 m. with short usually pendulous branches forming a narrow-pyramidal head; buds globose-ovoid, obtuse; branchlets yellow-brown changing to dark red-brown, pubescent for 5 to 6 years, and with long pale hairs while young. Leaves linear, 6-18 mm. long, rounded at apex, shining dark green and grooved above with broad white bands beneath. Cone sessile 2-2·5 cm. long; scales obovate, longer than broad, puberulous outside.

Native of N. America from S. Alaska to Idaho and California. Introduced to Britain in 1851.

The two Kentish plants were small, the larger being about a metre high, and they appeared well established in semi-natural woodland; occurring in the higher, drier part of the wood, on somewhat podsolised Tunbridge Wells Sand, which supported a typical dry acid woodland flora. The most frequent and conspicuous species in the immediate neighbourhood were:—

Quercus robur -d.
Castanea sativa co-sub.-d.
Betula pubescens co-sub.-d.
Taxus baccata
Pteridium aquilinum
Rubus spp.
Blechnum spicant
Scrophularia nodosa
Potentilla erecta
Teucrium scorodonia
Solidago virgaurea
Luzula pilosa

Dallimore and Jackson (1931, *Handbook of Coniferae*) state that the species is easily propagated from seed; and the plants in question probably arrived from Bedgebury Pinetum, which is only 3 km. away. Later in the same day, in the Pinetum itself, several small seedlings of this species, a few cm. high, were noted.—C. A. Stace.

34/C. **Chamaecyparis lawsoniana** (Murr.) Parl., 1864, in *Ann. Mus. Stor. Nat. Firenze*, **1**, 181; *Cupressus lawsoniana* A. Murray, 1855, in *Edinb. New Philos. J.*, new ser., **1**, 299. 16, W. Kent; small copse, Tunbridge Wells, several seedlings, c. 20-30 cm. high, established by an old neglected driveway near fruiting specimens of parent trees, 1958, C. A. Stace. 17, Surrey; self-sown seedlings on a wall near Queen's Cottage, Royal Botanic Gardens, Kew, E. Milne-Redhead (1959, *Lond. Nat.*, **38**, 21). 21, Middlesex; old wall, Harrow, a young tree; old wall, West Drayton, several seedlings, D. H. Kent (1959, *Lond. Nat.*, **38**, 21). Tree to 60 m. In cultivation usually a narrow-pyramidal tree furnished to the ground with branches; bark reddish-brown, divided into round scaly ridges; branchlets flattened, frond-like, arranged in horizontal planes: leaves closely appressed, acute or acutish, glandular, bright green to glaucous, marked below with often indistinct white streaks: staminate flowers crimson: cone globose, 8 mm. across, reddish-brown and bloomy; scales 8, with thin, acute, reflexed bosses; seeds 2-4 on each scale, broadly winged.

Native of western N. America. Introduced to Britain in 1854. Many garden forms are known.

The Kentish specimens grew in acid heathy soil. *Quercus robur* was dominant, with *Rhododendron ponticum*, *Betula pubescens*, *Calluna vulgaris*, *Deschampsia flexuosa* and *Potentilla erecta*.

It would be interesting to hear, from other members, of any conifers which they have seen self-sown in this country, in addition to the five non-native species mentioned by Dandy (1958, *List of British Vascular Plants*).—C. A. STACE.

53/M. **Berberis manipurana** Ahrendt, 1939, *Kew Bull.*, **1939**, 262; *B. knightii* Hort., non K. Koch; *B. xanthoxylon* Schneider, 1918, *Österr. Bot. Zeitschr.*, **67**, 27; *B. hookeri* var. *latifolia* Bean, 1921, *Trees and Shrubs Hardy in the British Isles*, **1**, 243. 16, W. Kent; Tunbridge Wells Common, one large bush, known for many years, and presumably bird-sown, K. E. BULL, det. at KEW. Evergreen shrub 3 m. high; stems erect, angled. Leaves elliptical, green, very glossy on the upper surface, paler beneath, 12 to 75 mm. by 15-30 mm. with 9-12 short spines on each side. Pedicels 10-15 mm. long; flowers pale yellow, 12 mm. across, the sepals tinged with red. Fruit oblong, 10 by 5 mm., tapering towards the end, black-purple, sometimes with a greyish bloom, persistent: style absent.

Native of Himalaya, long cultivated in British gardens where it has been much confused with *B. wallichiana* DC., a related species which may not be in cultivation.—D. H. KENT.

207/9. LATHYRUS PALUSTRIS var. **pilosus** (Cham.) Ledeb., 1843, *Fl. Rossica*, **i**, 686; *L. pilosa* Cham., 1831, in *Linnaea*, **6**, 548. 6, N. Som.; swampy hollow in sand-dunes, Berrow, 1958, D. Munro-Smith, det. N. Y. Sandwith (1959, C. I. & N. Y. Sandwith, *Proc. Bristol Nat. Soc.*, **29**, 430). This variety differs from the European plant in having a copious, curly pilosulous pubescence on all its vegetative parts. It is common in both N. America and N. Asia, and is assumed to be a recent introduction at Berrow where the native form of *L. palustris* has never been found and would be most unlikely to occur.

226/M. **Prunus mahaleb** L., 1753, *Sp. Plant.*, 474. C. I. & N. Y. Sandwith (1958, *Proc. Bristol Nat. Soc.*, **29**, 345) report the occurrence of this taxon as a naturalised species in a wood between Tregony and Tresillian, E. Cornwall, v.c. 2, 1936, and as a single small tree on the slope of the Downs opposite the Zoological Gardens, Clifton, W. Glos., v.c. 34, 1958 (the tree here is referred to f. *pendula* Dippel). Specimens from each locality have been deposited in Herb. Kew.

The following description is taken from Rehder, A., *Manual of Cultivated Trees and Shrubs*, edition 2. New York, 1956. Tree to 10 metres tall, with short stem and spreading branches forming a loose head; young branchlets tomentulose; leaves orbicular to broad-ovate, 3-6 cm. long, obtusely short-acuminate, rounded or subcordate at base, callously serrulate, pubescent along the midrib beneath, otherwise glabrous; petioles 1-2 cm. long; flowers white, 1·5 cm. across, fragrant, in 6-10 flowered racemes 3-4 cm. long, with small leaf-like bracts at base; sepals ovate, entire, shorter than calyx-tube: fruit about 6 mm. across, black.

A native of S.-E. Europe and W. Asia, the species has long been cultivated and is used as a stock for grafting cherries. It is also extensively cultivated in France in connexion with the cherry-pipe industry. —D. H. Kent.

237/D. **Crassula decumbens** Thunb., 1794, *Prodr. pl. Cap.*, 54; *Bulliarda trichotoma* Ecklon & Zeyher, 1837, *Enum.*, 290. 1b, Isles of Scilly; Seaways, St. Mary's, February 1959 (*Hb. Kew, Hb. Lousley*), April 14, 1959, H. G. Morgan (*Hb. Mus. Brit., Hb. Kew*); weed in bulbfields near Bants' Carn, St. Mary's, May 19, 1959, J. E. Lousley, 840 (*Hb. Mus. Brit., Hb. Kew*, etc.). A slender, glabrous, fleshy annual, 5-12 cm. tall. Stems pale, yellowish at first, turning reddish later, usually flaccid and decumbent, and sometimes rooting at the nodes, stiffer in dry exposed places, much branched from the base and above. Leaves opposite, slightly connate, 4-7 mm. long, lanceolate, subacute. Flowers numerous, axillary, on pedicels equalling or shorter than the leaves but elongating to 5-15 mm. in fruit. Sepals 4, acute, c. 2 mm. long, divided almost to the base, turning red in fruit. Petals 4, acute, pale pink, shorter than the sepals. Nectariferous scales red, obtuse, as wide as the ovaries. Ovaries with many ovules. Native of S. Africa.

This species was first observed by Mr. G. Baines, County Advisory Officer for Scilly of the National Agricultural Advisory Service, in February 1959 as an abundant weed in bulbfields at Seaways, and material supplied by him was sent through Mr. H. G. Morgan to Kew for identification. At this date it was more or less fully grown but not in flower, but the collection of material in flower and fruit on April 14 enabled Mr. R. D. Meikle to identify it as *C. decumbens*. In May I found it in four bulbfields near Bant's Carn, where it grew in abundance on sandy soil with the usual bulbfield weeds and associated especially with *Montia perfoliata*. It was common at the sides of tracks, and is no doubt spreading on the wheels of farm implements and trucks.

As is the case with a number of other aliens in Scilly, it is not easy to make convincing suggestions on the mode of introduction. A great many South African plants are grown in Tresco Abbey Gardens and it may have been brought in with these, but at present I have no evidence to support this. Its ability to thrive in the islands is explained by the rarity of frost so that it can grow through the winter on damp sand as in its native habitat in South Africa. Of our native species it is most closely allied to *Crassula tillaea*, which grows on sand, flowers in the spring, and also turns red as it fruits, but *C. decumbens* is distinguished at a glance by its pedicelled flowers, more slender looser habit, and greater size. It seems likely to spread rapidly through the abundance of seed produced but is too small a plant to offer serious competition to the crops with which it occurs as a weed.—J. E. LOUSLEY.

392/B. **Symphytum bulbosum** Schimp., 1825, in *Flora*, **8**, 17-22. 9, Dorset; in great abundance by stream, Abbotsbury, April 17, 1938, J. E. LOUSLEY and A. W. GRAVESON (*Hb. Lousley*, *Hb. Kew*).

A sparsely hispid perennial. Rhizome slender, elongate with subrotund tubers. Stem 30-50 cm. tall, simple or bifid, slender, flexuous, not winged, rough to the touch. Lower leaves ovate, 7-10 cm. long, rounded at the base, with petioles about equalling the blade; middle cauline leaves ovate-lanceolate, 12-17 cm. long, acute, narrowed at the base to a winged petiole 6-8 cm. long; upper leaves smaller, acute, sessile, slightly decurrent. Calyx divided for $\frac{3}{4}$ of its length into narrow, lanceolate, acute lobes. Corolla yellowish-white, 8-10 mm. long, with small erect lobes much exceeded by the narrow lanceolate scales. Native from Greece and the western Balkans through Istria, southern Switzerland and Italy to S. France, Sicily and Corsica; naturalised in Germany and Austria.

This species has been much confused with *S. tuberosum* L., but may be distinguished at a glance by the exserted lanceolate corolla scales. The slender widely spreading rhizome bears brown tubers about the size of hazel nuts at intervals, whereas the rhizome of *S. tuberosum* is irregularly knobbly, and swollen at the base of the stem.

The specimens on which this note is based were collected in April 1938, when Mr. A. W. Graveson took me to see what we assumed to be a puzzling variant of *S. tuberosum* growing in abundance by the stream near Abbotsbury Swannery. A specimen from this gathering at Kew was correctly identified by Miss P. Lewis, and Mr. N. Y. Sandwith drew my attention to this in April 1959. With the aid of my directions he was able to confirm that the plant is still flourishing in the original habitat, and that there were carpets of it over a considerable area in the adjacent woodland of Abbotsbury Gardens.

Mr. Graveson's first knowledge of this plant dates back to May 4, 1927, when a piece was brought to him by one of his pupils. A tuber was transferred to the school garden at Beaminster in 1928, where it is still flourishing, and he saw it at Abbotsbury himself in 1931, 1936, 1938 and 1959. It seems likely that *S. bulbosum* has been at Abbotsbury for a very much longer time. In the second edition of the *Flora of Dorsetshire*, *S. tuberosum* is given for Abbotsbury on the authority of "Miss Hawkins" and the first record cited as "Mansel-Pleydell, 1891" (Mansel-Pleydell, 1895). A search by D. H. Kent, N. D. Simpson, and myself has failed to trace a published record of 1891 but the habitat given in the *Flora* as "damp places and by the sides of streams" is appropriate for the Abbotsbury station for *S. bulbosum*. As there is no other evidence that *S. tuberosum* ever occurred there, as the two species have been so often confused, and as from present knowledge *S. bulbosum* apparently occurred in great abundance from the first, it is reasonable to accept its establishment as dating back to 1891. Its origin here is clearly that of a planted garden plant, but it has spread outside cultivation and maintained itself in competition with native species for at least 32, and probably 68 years.

I am greatly indebted to N. Y. Sandwith and A. W. Graveson for help in the preparation of this note.

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J. E. LOUSLEY.

544/R. **Centaurea repens** L., 1763, *Sp. pl.*, ed. 2, 1293; *C. picris* Pall., Willd., 1804, *Sp. pl.*, **3**, 2302; *Acroptilon repens* (L.) DC., *Prodr.*, **6**, 663.

36, Hereford.; railway siding, Hereford, 1959, Mrs. L. WHITEHEAD (*Hb. Kew*, det. R. D. MEIKLE; *Hb. Lousley*).

A creeping perennial spreading by horizontal roots to form dense patches. Stems erect, about 40 cm. tall, much branched from the base; leaves alternate, narrowly oblong on the main stems, linear-lanceolate on the branches, the lower with distant acute teeth, the upper smaller and entire. Heads solitary, terminating the stems and branches; involucre about 1 cm. wide, ovoid, silvery in bud. Outer phyllaries rounded-ovate, greenish with broad hyaline entire margins, the inner serrulate. Flowers numerous, all tubular, purplish; achenes obovoid with a deciduous pappus of stiff rough bristles.

Native from S. Russia and Asia Minor to Persia, Afghanistan and Baluchistan. Widely naturalised in Canada, U.S.A., S. Africa and Australia. Adventive in Austria (*Hb. Kew*) and Scandinavia (Hylander, 1955).

Mrs. Whitehead first noticed this alien on a railway siding at Hereford in 1950, when it was already well established. It has persisted through very rough treatment ever since, and now forms a patch about a yard square with a few shoots a little away from the main group. In most summers it has been cut down or burnt over, but in the autumn of 1959 good flowering specimens were available, and one of these was sent to Kew for identification.

C. repens is one of the world's most aggressive weeds and it is surprising that it has not appeared in Britain earlier. In eastern Canada it was first found in 1933 and in western Canada in 1928. It is now widely distributed in southwestern Manitoba, Saskatchewan and Alberta, and is quite common in south-central British Columbia. Several infestations are known in southern Ontario (Frankton, 1955). The seed was introduced with alfalfa seed from Turkestan in which Russian knapweed sometimes occurs in great quantity (Groh, 1940). The chromosome number has been determined on Canadian material as $2n = 26$, a basic chromosome number not yet recorded for other sections of the genus *Centaurea*, a fact which appears to support the erection of the monotypic genus *Acroptilon* Cass. (Moore & Frankton, 1954).

In the United States *C. repens* is naturalised from Michigan to

Washington, south to Missouri, Texas and southern California. Here again it is one of the group of unwelcome weeds brought in with Turkestan alfalfa (Hensel & Harling, 1922). An example quoted by Rogers (1928) illustrates the reckless way in which great quantities of the seed of this dangerous plant were formerly imported. He writes: "In March 1928, there was released from the Denver Custom-house approximately 50,000 pounds of Turkestan alfalfa seed, imported from Russia. About 25,000,000 seeds of Russian knapweed were brought in with this alfalfa seed. This is enough to produce a perfect stand on at least 5,000 acres of land".

In South Africa, *C. repens* was first recorded from Graaff-Reinet in 1915. By 1938 it had taken a firm hold in several districts of Cape Province, and was known in the Orange Free State and Transvaal. "No satisfactory method of eradication has been devised; ploughing breaks up the rhizomes and each piece left in the soil may produce a fresh plant" (Phillips, 1938). In Australia it occurs in Victoria, where it has been designated as *C. picris* under the Noxious Weeds Act since 1907 (Ewart, 1930), Queensland, New South Wales, and South Australia (designated under the Noxious Weeds Acts, 1931-39). In the latter it was first noticed at Renmark in 1930 (Richardson, 1933), and by 1957 was an aggressive weed widespread in the settled districts (Black, 1957).

A number of species known to be wool aliens have appeared at Hereford in recent years, and it is likely that a seed dropping from a truck containing wool or shoddy which had originated from South Africa or Australia may account for its presence on the railway siding. *C. repens* thrives under dry conditions and Hereford is probably too far west for it to spread from this initial introduction. If it should appear on the eastern side of England the authorities would be wise to take steps to exterminate it at an early stage. Relatively small sums spent on a study of the weeds of the world, and the means by which they are introduced, could have saved many countries in the past from vast expenditure in trying to cope with infestations once they had become established.

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J. E. LOUSLEY.

PLANT RECORDS

Compiled by E. C. Wallace

Records are for the year 1959 where no date is given.

The following signs are used:—

- § before the *L.B.V.P.* number: to indicate that the paragraph contains information necessitating a correction to an annotated copy of the *Comital Flora.*
- † before the *L.B.V.P.* number: to indicate that the plant is not a native species in the British Isles.
- † before the record: to indicate a species which, though native in some parts of the British Isles, is not so in the locality recorded.
- * before the record: to indicate a new vice-county record, not published previously to this issue of the *Proceedings.*
- ‡ before the record: to indicate a record additional to an annotated copy of the *Comital Flora,* but published elsewhere prior to the issue of the *Proceedings* in which it appears.
- [ ] enclosing a record: to indicate doubt as to the validity of the record, either of identification or locality.

It will be useful if, in future, National Grid Co-ordinates, made as accurate as is thought advisable, are added to all records. These will not be published, but the original cards containing them will be filed, and may be made available for reference.

V.c. 90, Forfar. The following additions should be made to the *Comital Flora* of plants recorded from the county by the late R. H. & M. Corstorphine, Arbroath (Herb. R. H. & M. Corstorphine, Queen's College, Dundee, and Corstorphine MS.):—

4/4. *Equisetum variegatum* Schleich. ex Weber & Mohr, 46/22c. *Ranunculus aquatilis* subsp. *pseudofluitans* (Syme) Clapham, 66/6b. *Fumaria muralis* subsp. *boraei* (Jord.) Pugsl., 72/1. *Diplotaxis muralis* (L.) DC., 72/2. *D. tenuifolia* (L.) DC., 98/4. *Barbarea verna* (Mill.) Aschers., 110/1. *Camelina sativa* (L.) Crantz, 111/1. *Descurainia sophia* (L.) Webb ex Prantl, 136/2. *Sagina ciliata* Fr., 141/2. *Arenaria leptoclados* (Reichb.) Guss., 154/9. *Chenopodium ficifolium* Sm., 162/2. *Tilia cordata* Mill., 163/4. *Malva neglecta* Wallr., 168/9. *Geranium pyrenaicum* Burm. f., 170/2. *Oxalis corniculata* L., 191/2. *Melilotus officinalis* (L.) Pall., 220/3(3). *Alchemilla filicaulis* Buser, 222/1. *Sanguisorba officinalis* L., 227/2. *Cotoneaster simonsii* Bak., 227/4. *Cotoneaster microphyllus* Wall. ex Lindl., 232/4(1). *Sorbus intermedia* (Ehrh.) Pers., 233/1. *Pyrus communis* L., 235/2b. *Sedum telephium* subsp. *fabaria* Syme, 258/2. *Circaea intermedia* Ehrh., 261/1. *Hippuris vulgaris* L., 285/1. *Apium graveolens* L., 310/1. *Pastinaca sativa* L., 319/15. *Euphorbia esula* L., 325/14. *Rumex sanguineus* L., 340/1. *Castanea sativa* Mill., 342/1. *Populus alba* L., 342/4. *P. nigra* L., 420/3. *Linaria repens* (L.) Mill., 445/3×5. *Mentha × gentilis* L., 466/1. *Nepeta cataria* L., 496/1. *Centranthus ruber* (L.) DC., 544/7. *Centaurea nemoralis* Jord., 555/1. *Mycelis muralis* (L.) Dumort., 577/21. *Potamogeton pectinatus* L., 579/1. *Ruppia spiralis* L. ex Dumort., 579/2. *R. maritima* L., 593/1. *Lilium martagon* L., 605/17. *Juncus subnodulosus* Schrank, 643/1. *Dactylorchis fuchsii* (Druce) Vermeul., 652/3. *Sparganium angustifolium* Michx., 663/1. *Carex laevigata* Sm., 663/67. *C. spicata* Huds., 663/68. *C. muricata* L., 669/3. *Glyceria declinata* Bréb., 700/1. *Calamagrostis epigejos* (L.) Roth.—U. K. DUNCAN.

15/8. ASPLENIUM SEPTENTRIONALE (L.) Hoffm. 48, Mer.; ten plants in a new locality near Llanymawddwy, E. H. and A. O. Chater and W. M. Condry (1959, *Nature in Wales*, **5**, 823).

§16/1. CETERACH OFFICINARUM DC. ‡91, Kincard.; garden wall in the neighbourhood of Stonehaven, K. W. Braid (1959, *Trans. & Proc. Bot. Soc. Edinb.*, **37**, 289).

21/3. DRYOPTERIS ABBREVIATA (DC.) Newm. 98, Argyll; Loch Restil side of Beinn an Lochain, A. G. KENNETH.

24/1. THELYPTERIS LIMBOSPERMA (All.) H. P. Fuchs (*T. oreopteris* (Ehrh.) Slosson). 112, Zetland; among rocks at south end of Birka Water, Northmavine, R. C. PALMER.

24/2. THELYPTERIS PALUSTRIS Schott. 73, Kirkcudbr.; Newlaw Moss, near Dundrennan, with *Salix* spp., *Carex paniculata*, etc., A. McG. STIRLING.

46/11. RANUNCULUS LINGUA L. 73, Kirkcudbr.; pond verge, Pulcres, Gatehouse-of-Fleet, A. McG. STIRLING.

§57/2. CERATOPHYLLUM SUBMERSUM L. ‡5, S. Som.; West Moor, Kingsbury Episcopi, E. J. Hamlin, 1957 (1958, *Proc. Som. Arch. & N.H.S.*, **101** and **102**, 137).

†58/6. PAPAVER SOMNIFERUM L. 112, Zetland; several dozen plants on waste ground near Scalloway, W. SCOTT.

§59/1. MECONOPSIS CAMBRICA (L.) Vig. *†112, Zetland; a few plants by roadside near Scalloway School, W. SCOTT.

66/10. FUMARIA PARVIFLORA Lam. 24, Bucks.; swede field near Chesham, J. ROGERSON, det. E. C. WALLACE.

§94/2. DRABA NORVEGICA Gunn. ‡107, E. Sutherland; Ben More Assynt, D. A. Ratcliffe (as *D. rupestris*) (1960, *Trans. & Proc. Bot. Soc. Edinb.*, **39**, 113).

94/4. DRABA MURALIS L. 98, Argyll; old partially broken down wall, Langsdale Road, Oban, 1957, P. MACPHERSON.

§102/3. Rorippa sylvestris (L.) Bess. ‡91, Kincard.; by river Dee near Aberdeen, N. Robson and G. Reid: ‡92, S. Aberdeen; vicinity of Culter, E. W. Fenton, both comm. A. H. Sommerville (1959, *Trans. & Proc. Bot. Soc. Edinb.*, **37**, 287).

§†108/4. Sisymbrium orientale L. ‡5, S. Som.; Bridgwater, 1954, E. J. Hamlin (1956, *Proc. Som. Arch. & N.H.S.*, **99** and **100**, 115).

123/12. Silene noctiflora L. 76, Renfrew; wayside, Lochvinnock, E. R. T. Conacher.

131/4. Cerastium alpinum L. 107, E. Sutherland; Ben More Assynt, D. A. Ratcliffe (1960, *Trans. & Proc. Bot. Soc. Edinb.*, **39**, 113).

131/5. Cerastium arcticum Lange. 98, Argyll; Ben Lui, A. G. Kenneth.

†165/A. Abutilon theophrasti Medic. 58, Chester; growing in quantity in a carrot field, Mobberley, J. W. Franks.

§166/3. Linum anglicum Mill. 73, Kirkcudbr.; calcareous sandy pastures, Brighouse Bay; apparently native, A. McG. Stirling. Remove from brackets in *C.F.*—Ed.

§†168/6. Geranium phaeum L. ‡5, S. Som.; North Coker, 1950-1954, W. E. Palmer (1956, *Proc. Som. Arch. & N.H.S.*, **99** and **100**, 115).

170/1. Oxalis acetosella L. 112, Zetland; damp hollow under rocks, Bergs of Housetter, Northmavine, W. Scott.

†170/10. Oxalis pes-caprae L. 4, N. Devon; rampant garden weed since before 1940, Woolacombe, D. W. Fawdry, det. and comm. D. P. Young.

189/1. Ononis repens L. 98, Argyll; grassy bank by lane Stroneshar, near Loch Ederline, A. G. Kenneth and E. C. Wallace.

†191/4. Melilotus indica (L.) All. 49, Caern.; roadside near Bangor, R. H. Roberts.

§192/10. Trifolium striatum L. *73, Kirkcudbr.; grassy sea-cliffs west of Abbey Burnfoot, in small quantity, A. McG. Stirling.

§212/12. Potentilla crantzii (Crantz) G. Beck ex Fritsch. ‡73, Kirkcudbr.; sparingly on shattered cliffs, between 1,100 and 1,600 feet in the Lamachan Hill area, a few miles west of Clatteringshaws Reservoir. D. A. Ratcliffe (1959. *Trans. & Proc. Bot. Soc. Edinb.*, **37**, 288). ‡105, W. Ross; Seana Bhraigh, 1956, D. A. Ratcliffe (1960, *Trans. & Proc. Bot. Soc. Edinb.*, **39**, 113).

§217/1. DRYAS OCTOPETALA L. ‡106, E. Ross; Seana Bhraigh, 1956, D. A. Ratcliffe (1960, *Trans. & Proc. Bot. Soc. Edinb.*, **39**, 113).

§218/2. AGRIMONIA ODORATA (Gouan) Mill. *97 (Argyll); roadside near Killundine, Morvern, A. McG. STIRLING.

§221/1. APHANES ARVENSIS L. ‡5, S. Som.; Selworthy, 1956, P. C. Hall (1958, *Proc. Som. Arch. & N.H.S.*, **101** and **102**, 136).

†224/1. ACAENA ANSERINIFOLIA (J. R. & G. Forst.) Druce. 112, Zetland; a small patch by roadside near Scalloway, 1958, W. SCOTT.

†225/5. ROSA RUGOSA Thunb. 112, Zetland; Ellister, Dunrossness, W. SCOTT.

†225/P. ROSA PALUSTRIS Marsh. 112, Zetland; planted in the Ham Burn, Foula, W. SCOTT, det. at KEW.

§†227/2. COTONEASTER SIMONSII Bak. ‡5, S. Som.; naturalised in hedgerows, Selworthy, 1956, H. J. M. Bowen (1958, *Proc. Som. Arch. & N.H.S.*, **101** and **102**, 136).

†235/3. SEDUM SPURIUM Bieb. 112, Zetland; on a short steep cliff, Scalloway, W. SCOTT.

§238/1. UMBILICUS RUPESTRIS (Salisb.) Dandy. ‡91, Kincard.; a few plants on an old wall by the roadside south of Aberdeen, A. H. Sommerville (1959, *Trans. & Proc. Bot. Soc. Edinb.*, **37**, 287).

§239/1. SAXIFRAGA NIVALIS L. ‡106, E. Ross; Seana Bhraigh, 1956: ‡107, E. Sutherland; Ben More Assynt, D. A. Ratcliffe (1960, *Trans. & Proc. Bot. Soc. Edinb.*, **39**, 113).

§239/11. SAXIFRAGA RIVULARIS L. ‡106, E. Ross; Seana Bhraigh, 1956, D. A. Ratcliffe (1960, *Trans. & Proc. Bot. Soc. Edinb.*, **39**, 113).

247/2×1. DROSERA × OBOVATA Mert. & Koch. 101, Kintyre; shore of Loch Fuar Bheinne, South Knapdale, A. G. KENNETH and E. C. WALLACE.

§†254/6. EPILOBIUM ADENOCAULON Hausskn. ‡5, S. Som.; river bank, Bradford-on-Tone, 1956, A. D. and O. M. Hallam, det. G. M. Ash (1958, *Proc. Som. Arch. & N.H.S.*, **101** and **102**, 136).

§†254/13. EPILOBIUM NERTERIOIDES Cunn. ‡45, Pemb.; many plants in Treffgarne quarry, J. W. Donovan (1959, *Nature in Wales*, **5**, 823).

§282/1. CONIUM MACULATUM L. *112, Zetland; waste ground by piles of wood, opposite Freefield Post Office, Lerwick, R. C. PALMER.

§291/1. CARUM VERTICILLATUM (L.) Koch. ‡36, Hereford; above Vowchurch, 1958, K. Johnston (1959, *Trans. Woolhope N.F.C.*, **36**, 131).

300/4. OENANTHE LACHENALII C. C. Gmel. 101, Kintyre; salt marsh pasture, Luine Muirich, Kilmory, A. G. KENNETH and E. C. WALLACE.

320/2. POLYGONUM RAII Bab. 101, Kintyre; shore near Machrihanish Links, A. G. KENNETH and E. C. WALLACE.

§320/5. POLYGONUM VIVIPARUM L. *73, Kirkcudbr.; wet flushes on north-east side of Merrick, P. S. LLOYD and A. McG. STIRLING. 112, Zetland; sparingly on north side of Sneug, Foula: confirms F. J. Lewis's record (1911), W. SCOTT.

§320/6. POLYGONUM BISTORTA L. ‡†112, Zetland; by a house at Maywick, Dunrossness, W. SCOTT. But see *Top. Bot.*—ED.

§†341/1. QUERCUS CERRIS L. ‡5, S. Som.; Polden Hills, near Compton Dundon, originally planted, now regenerating, 1956, O. M. Hallam (1958, *Proc. Som. Arch. & N.H.S.*, **101** and **102**, 136).

342/3. POPULUS TREMULA L. 112, Zetland; cliff-face, Ness of Islesburgh, near Mavis Grind, J. COPLAND, comm. W. SCOTT.

342/12×9. SALIX × SMITHIANA Willd. 112, Zetland; Burn of Geosetter, Dunrossness, W. SCOTT, det. at KEW.

§343/22. SALIX RETICULATA L. ‡105, W. Ross; Seana Bhraigh, 1956, D. A. Ratcliffe (1960, *Trans. & Proc. Bot. Soc. Edinb.*, **39**, 112).

§406/1. CALYSTEGIA SEPIUM (L.) R.Br. *†112, Zetland; weed in a neglected garden, Scalloway, W. SCOTT.

413/3. SOLANUM NIGRUM L. 49, Caern.; on disturbed soil, Bangor, R. H. ROBERTS.

†415/1. DATURA STRAMONIUM L. 49, Caern.; garden weed, Upper Bangor, R. H. ROBERTS.

§†420/2. LINARIA PURPUREA (L.) Mill. ‡5, S. Som.; Wembdon, 1956, E. J. Hamlin (1958, *Proc. Som. Arch. & N.H.S.*, **101** and **102**, 136).

§435/4. EUPHRASIA FRIGIDA Pugsl. *73, Kirkcudbr.; Merrick, at 2,300 ft., P. S. LLOYD and A. McG. STIRLING, det. P. F. YEO.

§435/12. EUPHRASIA OCCIDENTALIS Wettst. *73, Kirkcudbr; sea-cliffs near Abbey Burnfoot, Kirkcudbright, A. McG. STIRLING, det. P. F. YEO.

§442/2. UTRICULARIA NEGLECTA Lehm. ‡76, Renfrew; in deep pools on Kilmacolm Moss, abundant but not flowering, 1958, E. R. T. Conacher, det. R. Mackechnie (1959, *Glasgow Nat.*, **18**, 82).

442/3. UTRICULARIA INTERMEDIA Hayne. 101, Kintyre; peaty moorland pools, Loch Fuar Bhanne, South Knapdale, A. G. KENNETH and E. C. WALLACE.

445/2. MENTHA PULEGIUM L. 33, E. Glos.; Foxcote, Miss L. ABELL.

445/3×5. MENTHA GENTILIS var. GRACILIS (Sole) Briq. 33, E. Glos.; Foxcote, Miss L. ABELL.

459/6. STACHYS PALUSTRIS L. 112, Zetland; a patch by roadside near Stenness, Esha Ness, W. SCOTT.

475/7. CAMPANULA ROTUNDIFOLIA L. 112, Zetland; by rocks, Ness of Islesburgh, near Mavis Grind, very rare, J. COPLAND, comm. W. SCOTT.

§485/6. GALIUM PUMILUM Murr. *97 (Argyll); basalt crags, Ben na h'Uamha, Morvern, A. McG. STIRLING.

§485/10. GALIUM ULIGINOSUM L. ‡44, Carm.; marshy meadow N.E. of Llanboidy, 1958, B.S.B.I. FIELD MEETING.

§†503/1. GALINSOGA PARVIFLORA Cav. ‡5, S. Som.; bombed site, Yeovil, 1951 (1956, *Proc. Som. Arch. & N.H.S.*, **99** and **100**, 116). ‡67, Northumberland, S.; turnip field near Woolsington, 1958, T. W. Wanless (1959, *Vasc.* (*Subst.*), **44**, 15).

544/3. CENTAUREA CYANUS L. †77, Lanark; Walston, one plant in cabbage field, E. H. McCOSH.

§544/6. CENTAUREA NIGRA L. *112, Zetland; a small patch by house at south Whiteness; a small patch by roadside at Walls, W. SCOTT.

§†544/9. CENTAUREA CALCITRAPA L. *78, Peebles; one plant on a rubbish-dump in old quarry, Broughton, E. H. McCOSH.

554/1. LACTUCA SERRIOLA L. 37, Worcs.; waste ground near Evesham station, R. H. ROBERTS.

558/1(54). HIERACIUM VAGENSE (F. J. Hanb.) A. Ley. *73, Kirkcudbr.; rocks by river Dee at Old Tongland Bridge, Kirkcudbright, A. McG. STIRLING, det. P. D. SELL.

558/1(67). HIERACIUM SUBPLANIFOLIUM Pugsl. *73, Kirkcudbr.; sea-cliffs at The Torrs, Colvend, A. McG. STIRLING and H. MILNE-REDHEAD, det. P. D. SELL.

†571/1. LAGAROSIPHON MAJOR (Ridl.) Moss. 59, S. Lancs.; farm pond, Crowshaws, Blackrod, near Chorley, 1958, J. HODGE, det. R. D. MEIKLE, comm. E. MILNE-REDHEAD.

§576/1. Zostera marina L. ‡5, S. Som.; Stolford, 1957, D. S. Ranwell (1958, *Proc. Som. Arch. & N.H.S.*, **101** and **102**, 138).

576/2. Zostera angustifolia (Hornem.) Reichb. 106, E. Ross; shore between Alness and Dingwall, E. R. T. Conacher, det. T. G. Tutin.

605/2. Juncus tenuis Willd. 5, S. Som.; one patch in cart-track near Huish Champflower, 1957, A. D. and O. M. Hallam (1958, *Proc. Som. Arch. & N.H.S.*, **101** and **102**, 138).

§605/8. Juncus inflexus L. *101, Kintyre; wayside by road to Island of Danna, Luine Mhuirich, A. G. Kenneth and E. C. Wallace.

§605/24. Juncus castaneus Sm. ‡107, E. Sutherland; Ben More Assynt, D. A. Ratcliffe (1960, *Trans. & Proc. Bot. Soc. Edinb.*, **39**, 113).

§605/K. Juncus kochii F. W. Schultz. ‡5, S. Som.; Rainsbury; Holford; bog north of Churchstanton, A. D. and O. M. Hallam: Britty Common; Buckland St. Mary, A. J. Dodd (1956, *Proc. Som. & Arch. N.H.S.*, **99** and **100**, 119).

§†606/4. Luzula luzuloides (Lam.) Dandy & Wilmott. *37, Worcs.; roadside bank, Barnt Green, M. C. Clark, conf. J. E. Lousley.

§606/25. Juncus biglumis L. ‡107, E. Sutherland; Ben More Assynt, D. A. Ratcliffe (1960, *Trans. & Proc. Bot. Soc. Edinb.*, **39**, 113).

§625/6. Epipactis phyllanthes G. E. Sm. ‡48, Mer.; sandy grassland near the dunes, Morfa Dyffryn, P. M. Benoit (1959, *Nature in Wales*, **5**, 809).

642/1. Orchis purpurea Huds. 17, Surrey; a single plant in a plantation in the Limpsfield area, 1958, Miss D. Smith; identified from a floret sent to the Cambridge Botanic Garden by T. A. Smith; the plant shown to me in 1959; this is the fourth recorded station in Surrey this century, D. P. Young.

642/7×5. Orchis mascula × morio. 52, Anglesey; five plants in grassland, Cors Goch, near Brynteg, with both parents, R. H. Roberts, conf. V. S. Summerhayes (1959, *Nature in Wales*, **5**, 826).

652/4. Sparganium minimum Wallr. 52, Anglesey; in Llyn Wyth Eidion, R. H. Roberts.

§653/2. Typha angustifolia L. *101, Kintyre; by Loch Cill an Aoughais, South Knapdale, A. G. Kenneth and E. C. Wallace.

†658/R. Cyperus rotundus L. 21, Middx.; a small patch among grass, Primrose Hill, Hampstead, D. H. Kent.

§659/1. SCHOENUS NIGRICANS L. ‡5, S. Som.; plentiful on Clean Moor, Bathealton, 1957, A. D. and O. M. Hallam (1958, *Proc. Som. Arch. & N.H.S.*, **101** and **102**, 138).

661/1. CLADIUM MARISCUS (L.) Pohl. 5, S. Som.; Butleigh Moor, 1955, Mrs. D. H. Perret and E. J. Hamlin (1956, *Proc. Som. Arch. & N.H.S.*, **99** and **100**, 119). 101, Kintyre; by Loch Cill an Aoughais, South Knapdale, A. G. KENNETH. 103, Mid Ebudes; Loch an Duine, Arinagour, Isle of Coll, A. McG. STIRLING.

§663/7. CAREX LEPIDOCARPA Tausch. *73, Kirkcudbr.; marsh near the shore, Torrs Point, Kirkcudbright, A. McG. STIRLING.

§663/7b. CAREX LEPIDOCARPA subsp. SCOTICA E. W. Davies. *64, Mid-W. York; banks of river Skirfare, Arncliffe, M. B. GERRANS, det. A. C. JERMY.

663/8×10. CAREX DEMISSA × SEROTINA. 101, Kintyre; Links of Machrihamish, A. G. KENNETH and E. C. WALLACE.

§663/13. CAREX CAPILLARIS L. ‡105, W. Ross; Ben Lair, 1956; Seana Bhraigh, 1957, D. A. Ratcliffe (1960, *Trans. & Proc. Bot. Soc. Edinb.*, **39**, 112).

§663/19. CAREX SAXATILIS L. ‡107, E. Sutherland; Ben More Assynt, D. A. Ratcliffe (1960, *Trans. & Proc. Bot. Soc. Edinb.*, **39**, 113).

§663/29. CAREX PAUPERCULA Michx. ‡75, Ayr; moorland west of Eaglesham in some quantity, 1958, E. R. T. Conacher, det. R. Mackechnie (1959, *Glasgow Nat.*, **18**, 82).

§663/43. CAREX ATRATA L. ‡105, W. Ross; Mullach Coire Mhic Fearchair, 1956; Seana Bhraigh, 1956, D. A. Ratcliffe (1960, *Trans. & Proc. Bot. Soc. Edinb.*, **39**, 113).

670/4. FESTUCA ALTISSIMA All. 75, Ayr; Ness Glen, Loch Doon, A. McG. STIRLING.

§675/1. NARDURUS MARITIMUS (L.) Murb. 15, E. Kent; chalkpit, Hollingbourne: *16, W. Kent; foot of downs, Trottiscliffe; Halling Warren, J. F. and P. C. HALL.

§676/4. POA ALPINA L. ‡107, E. Sutherland; Ben More Assynt, D. A. Ratcliffe (1960, *Trans. & Proc. Bot. Soc., Edinb.*, **39**, 113).

§676/7. POA GLAUCA Vahl. ‡106, E. Ross; Seana Bhraigh, 1956, D. A. Ratcliffe (1960, *Trans. & Proc. Bot. Soc. Edinb.*, **39**, 113).

§683/13. BROMUS LEPIDUS Holmberg. ‡5, S. Som.; Selworthy, 1956, P. C. Hall (1958, *Proc. Som. Arch. & N.H.S.*, **101** and **102**, 137).

§696/2. DESCHAMPSIA ALPINA (L.) Roem. & Schult. ‡107, E. Sutherland; Ben More Assynt, D. A. Ratcliffe (1960, *Trans. & Proc. Bot. Soc. Edinb.*, **39**, 113).

§700/1. CALAMAGROSTIS EPIGEJOS (L.) Roth. ‡45, Pemb.; with *Molinia caerulea* on a steep hill above a sea-cliff, Marloes, 1958, T. A. W. Davis (1959, *Nature in Wales*, **5**, 791).

701/4. AGROSTIS GIGANTEA Roth. 24, Bucks.; hedgebank, Chesham Bois, J. ROGERSON.

716/1×2. SPARTINA × TOWNSENDII H. & J. Groves. 73, Kirkcudbr.; becoming established on mud-flats in Fleet Bay, Gatehouse, A. McG. STIRLING.

ABSTRACTS FROM LITERATURE

Compiled by D. H. KENT

Thanks are due to E. B. Bangerter, A. C. Jermy and A. E. Wade for their assistance

SYSTEMATIC, ETC.

1/1. LYCOPODIUM SELAGO L.—See 1/3. LYCOPODIUM ANNOTINUM L

1/3. LYCOPODIUM ANNOTINUM L. Barkman, J. J., 1958, Nieuwe vindplaatsen van Lycopodium annotinum, L. selago en Goodyera repens en hun standplaats, *Correspondentieblad* (Rijksherbarium), **11**, 112-116.

4/1×4. EQUISETUM × TRACHYODON A. Braun. Westhoff, V. and Leeuwen, C. G. Van, 1957, Equisetum trachyodon A.Br. gevonden bij Asperen, *Correspondentieblad*, **6**, 72-73.

4/9. EQUISETUM ARVENSE L. Jongh, S.-E. de, 1957, Equisetum arvense L., *Correspondentieblad*, **4**, 42.

5→ PTEROPSIDA. Fuchs, H. P., 1958, Identification et validité du Polypodium pterioides Lamarck, *Bull. Soc. Bot. France*, **105**, 338-343. The author equates the synonymy that has arisen from the interpretation of *Polypodium pterioides* described by Lamarck in his *Flore française*, vol. 1 (1778). The type specimen could not be found in Herb. Lamarck in Paris, but from exsiccata named by Lamarck, and from his later publications, it is clear that he confused his species with both *Thelypteris oreopteris* (Ehrh.) Slosson and *T. palustris* Schott.—[A.C.J.]

8/1. PTERIDIUM AQUILINUM (L.) Kuhn. Braid, K. W., 1959, Bracken: a review of the literature, *Commonwealth Bureau of Pastures and Field Crops, Hurley, Mimeographed Publication*, No. **3**. Pp. 1-69.

12/1. ONOCLEA SENSIBILIS L. Sykes, W., 1959, Onoclea sensibilis, a distinctive hardy fern well worth growing, *Gard. Chron.*, **146**, 75.

14/1. PHYLLITIS SCOLOPENDRIUM (L.) Newm. Reekmans, M., 1958, Contribution a l'étude de l'apogamie chez Asplenium scolopendrium L., *Lejeunia*, **21**, 21-28.

14/1. PHYLLITIS SCOLOPENDRIUM (L.) Newm. Sipkes, C., 1959, Het uitzaaien van Tongvaren, *De Levende Natuur*, **62**, 78-79.

14/1. PHYLLITIS SCOLOPENDRIUM (L.) Newm. Visser, A. de, 1957, De Tongvaren in Zeeland, *Correspondentieblad*, **5**, 57-58.

15. ASPLENIUM. Eberle, G., 1957, Farne auf Serpentin, *Natur und Volk*, **87**, 203-213.

15. ASPLENIUM. Eberle, G., 1958, Braunstieliger und Nordischer Streifenfarn und ihre Mischlinge, *Natur und Volk*, **88**, 312-320.

15/1. ASPLENIUM ADIANTUM-NIGRUM L. Tenius, K., 1956, Der schwarze Streifenfarn, *Beitr. Naturk. Nieders.*, **9**, 16-18.

16/1. CETERACH OFFICINARUM DC. Andreas, C. H., 1957, Ceterach officinarum Lamk. et DC., *Correspondentieblad*, **4**, 47.

16/1. CETERACH OFFICINARUM DC. Braid, K. W., 1959, Ceterach officinarum DC. in east Scotland, *Trans. & Proc. Bot. Soc. Edinb.*, **37**, 289-290. Reviews the distribution of *Ceterach officinarum* in Scotland and reports several new stations for the species.—[D.H.K.]

16/1. CETERACH OFFICINARUM DC. Eberle, G., 1959, Altes und Neues vom Schriftfarn (Ceterach officinarum), *Natur und Volk*, **89**, 229-236.

16/1. CETERACH OFFICINARUM DC. Sipkes, C., 1957, Ceterach in Zuid-Holland, *Correspondentieblad*, **3**, 37-38.

21/7. DRYOPTERIS DILATATA (Hoffm.) A. Gray. Voeller, B. R. & Cuttering, E. G., 1959, Experimental and analytical studies of pteridophytes, 38. Some observations on spiral and bijugate phyllotaxis in Dryopteris aristata Druce, *Ann. Bot.*, **91**, 391-396.

27/1. AZOLLA FILICULOIDES Lam. Duigan, S. L. & Cookson, I. C., 1957, The occurrence of Azolla filiculoides L. and associated vascular plants in a quaternary deposit in Melbourne, Australia, *Proc. Roy. Soc. Victoria*, **69**, 5-13.

36/1. CALTHA PALUSTRIS L. Ploeg, D. T. E. Van der, 1957, Caltha palustris L. in de Westelijke helft van Friesland, *Correspondentieblad*, **3**, 30-31.

36/1. CALTHA PALUSTRIS L.—See 616/4. IRIS PSEUDACORUS.

43. ANEMONE. Heimburger, M., 1959, Cytotaxonomic studies in the genus Anemone, *Canad. J. Bot.*, **37**, 587-612.

43. ANEMONE. Trela, Z., 1959, Badania cytologiczne nad gatunkami rodzaju Anemone L. mystepujacymi w Polsce, *Acta Biol. Cracov.*, **1**, 151-158.

46. RANUNCULUS. Meikle, R. D., 1959, The Batrachian Ranunculi of the Orient, *Notes Roy. Bot. Gard. Edinb.*, **23**, 13-22. A revision of the Oriental species of *Ranunculus* subgenus *Batrachium* includes most taxa found in Britain.

The author considers that *R. aquatilis* L. (*R. heterophyllus* Weber) and *R. peltatus* Schrank are specifically distinct from each other, and *R. aquatilis* subsp. *peltatus* is reinstated in specific rank. *R. sphaerospermus* Boiss. & Blanche is reduced to **R. peltatus** subsp. **sphaerospermus** (Boiss. & Blanche) Meikle, comb. nov. The author points out that material of *R. peltatus* subsp. *sphaerospermus* from the British Isles differs from the Oriental plant in having larger achenes, equalling those of *R. peltatus* subsp. *peltatus* in size, and suggests that the British plant should be differentiated perhaps as a variety of subsp. *sphaerospermus*.

R. aquatilis subsp. *pseudofluitans* does not occur in the Orient, but the author points out that it is closely allied to *R. peltatus* and should perhaps be placed under that species.

A key and full synonymy are given.—[D.H.K.]

46/24. RANUNCULUS FICARIA L. Wanless, T. W., 1959, The occurrence of black-marked forms of two plant species, *Vasc.* (*Subst.*), **44**, 13. Notes on the variation of leaf-blotches in *Ranunculus ficaria* and *Arum maculatum*.—[D.H.K.]

57/1. CERATOPHYLLUM DEMERSUM L. Julin, E. & Luther, H., 1959, Om blomning och fruktsättning hos Ceratophyllum demersum i Fennoskandien, *Bot. Not.*, **112**, 285-312. Studies on *Ceratophyllum demersum* in Fennoscandia suggest that the present sparse occurrence of the species in the north of the area is due to it being a relict from a larger frequency in post-glacial times.—[D.H.K.]

57/2. CERATOPHYLLUM SUBMERSUM L. Jensen, N., 1959, Ceratophyllum submersum L., Tornløs Hornblad i Danmark, *Flora og Fauna*, **65**, 53-57. An account of *Ceratophyllum submersum* in Denmark.—[D.H.K.]

62/1. CHELIDONIUM MAJUS L. Thaler, I., 1959, Ein neues Vorkommen von Chelidonium majus L. var. fumariifolium (DC.) Koch in Graz, *Österr. Bot. Zeitschr.*, **106**, 354-356.

67/1. BRASSICA OLERACEA L. Helm, J., 1959, Über den Typus einiger von Linné aufgestellter, nicht kopfbildender Sippen von Brassica oleracea L., *Fedde Rep.*, **62**, 44-59.

67/2. BRASSICA NAPUS L. Bijok, K., 1959, Studia nad kariologia Brassica napus L. var. biennis (Schübler et Mart.) Rchb. i Brassica napus var. typica Posp., *Acta Soc. Bot. Pol.*, **28**, 365-372. The chromosome number $2n=38$ has been confirmed for eight forms of *Brassica napus* var. *biennis* (Schübler & Mart.) Reichb. cultivated in Poland as well as for two forms of *B. napus* var. *typica* Posp.—[D.H.K.]

79/P. LEPIDIUM PERFOLIATUM L. Wissjulina, E. D. & Tikhvinskaya, V. D., 1959, On the biology of Lepidium perfoliatum, *Ukrain. Bot. Zhurn.*, **16**, 42-45 (in Russian).

102/3. RORIPPA SYLVESTRIS (L.) Bess. Allard, H. A., 1959, A sterile form of Rorippa sylvestris (L.) Bess., *Castanea*, **24**, 50-51.

108/2. SISYMBRIUM IRIO L. Khoshoo, T. N., 1958-59, Biosystematics of Sisymbrium irio complex, 1. Modifications in phenotype, *Caryologia*, **11**, 109-132: 2. Morphology of the races, *op. cit.*, **11**, 135-137: 3. Cytology of the races, *op. cit.*, **11**, 297-318: 4. Origin of triploid, hexaploid and octoploid, *op. cit.*, **11**, 319-325: 5. Mode of pollination, *op. cit.*, **11**, 330-333: Khoshoo, T. N. & Sharma, V. B., 6. Reciprocal pollinations and seed failure, *op. cit.*, **12**, 71-97: Khoshoo, T. N., 7, Meiosis in hybrids, *op. cit.*, **12**, 98-103.

111/A. AUBRIETA DELTOIDEA (L.) DC. Jongh, S.-E. de, 1957, Aubrieta deltoidea (L.) DC., *Correspondentieblad*, **3**, 27-28.

113/7. VIOLA LACTEA Sm. Moore, D. M., 1959, Population studies on Viola lactea Sm. and its wild hybrids, *Evolution*, **13**, 318-332. The occurrence and extent of natural hybridisation involving *Viola lactea* is assessed by means of population analyses and these data are used in evaluating the field status and evolutionary position of this species. Wild populations including *V. lactea* were sampled over much of its range in Britain and Portugal. Primary classification of populations was by means of polygonal graphs and more detailed analyses were made by using pictorialised scatter diagrams and fertility studies.

The hybrid *V. canina* × *lactea*, though fertile, was found only rarely in the field since the species are ecologically separated and only abnormal habitat conditions bring them together.

The artificial hybrid between *V. lactea* and *V. riviniana* is of low fertility, but the species often come into contact in the field and intermediate hybrids are frequent. Results from some population analyses are presented to demonstrate the varying degrees of introgressive hybridisation involving *V. lactea* and *V. riviniana*. Some data are given suggesting that introgression is achieved initially by selfing in the cleistogamous flowers of the hybrid and subsequently by outcrossing in later segregates.

The influx of genes from *V. riviniana* has been shown to increase the physiological adaptability of *V. lactea* and the possible implication of this introgression for the future evolution and survival of *V. lactea* are discussed.—[Author's summary.]

114. POLYGALA. Larsen, K., 1959, On the cytological pattern of the genus Polygala, *Bot. Not.*, **112**, 369-371.

115/5. HYPERICUM PERFORATUM L. Tisdale, E. W., Hironaka, M. & Pringle, W. L., 1959, Observations on the autecology of Hypericum perforatum, *Ecology*, **40**, 54-62. *Hypericum perforatum*, an introduced species in N. America, has become a major weed on the ranges of the Pacific Northwest and California. In Idaho, it is confined largely to the northern part of the state, and has become most abundant on depleted areas of grasslands, now occupied by annual grasses, especially *Bromus* spp.

Studies were made of various features of the autecology of the species including seed production and germination, seedling behaviour and vegetative production.

During a two year study seed production was found to average 69 seeds per capsule, and 23,350 seeds per plant. Germination under laboratory conditions at a temperature of 70-78° F. averaged 65% for many samples. Seed stored for 15 years gave 50% germination, while seed buried at depths of 1″ and 3″ retained similar viability after 3 years in soil.

H. perforatum seedlings were found to be scattered in the field and mortality often approached 100%. Germination occurred mainly in May, and the normal dry period of late July and August proved to be the critical period for seedling survival. The distribution pattern of the species suggests occasional large scale establishment of seedlings under particularly favourable conditions. Vegetative propagation accounts for much of the local spread. The root system and the phenology of the plant are also discussed.—[D.H.K.]

115/15. HYPERICUM CANADENSE L. Jonker, F. P., 1959, Hypericum canadense in Europe, *Acta Bot. Neerl.*, **8**, 185-186. Reviews the records of *Hypericum canadense* in France, Holland and Ireland, and suggests that the species may be a relict native rather than a recent introduction.—[D.H.K.]

123→ CARYOPHYLLACEAE. Baker, H. G., 1958, Hybridization between dioecious and hermaphrodite species in the Caryophyllaceae, *Evolution*, **12**, 423-427.

127. Dianthus. Ribaupierre, R. de, 1957, Caryologie des formes suisses de Dianthus carthusianorum L. et de D. caryophyllus L. ssp. silvester (Wulfen) Rouy et Foucaud, *Arch. Klaus-Stift. Ver. Forsch.*, **32**, 574-576. Experiments on the Swiss forms of *Dianthus carthusianorum* and *D. caryophyllus* reveal no evidence of polyploidy, the chromosome numbers being constant at $2n=30$.—[E.B.B.]

129/1. Saponaria officinalis L. Braid, K. W., 1959, Saponaria officinalis L. in Aberdeenshire, *Trans. & Proc. Bot. Soc. Edinb.*, **37**, 290.

131/7. Cerastium holosteoides Fr. Löve, A. & Chennaveeraiah, M. S., 1959, Cytotaxonomy of Cerastium holosteoides, *Phyton*, **8**, 38-43. The species *Cerastium holosteoides* and its three subspecies—*holosteoides*, *glabrescens* and *pseudoholosteoides* were not well understood until Hylander and Möschl respectively clarified their synonymy and taxonomy.

Some cytologists have reported different chromosome numbers for the species, but cytological studies by the authors on correctly named material of all the races have produced $2n=144$. It is therefore concluded that only this number is typical of the species and that other numbers reported are errors.—[D.H.K.]

137/1. Minuartia verna (L.) Hiern. Corley, R. S., 1959, Minuartia verna, *Gard. Chron.*, **145**, 169.

154→ Chenopodiaceae. Kowal, T. & Kuzniewski, E., 1959, Uogólnienie metody dendrytowej i zastosowanie jej do systematyki roślin na przykladzie rodzajów Chenopodium L. i Atriplex L., *Acta Soc. Bot. Pol.*, **28**, 249-259. Studies on *Chenopodium* and *Atriplex* lead to the following conclusions:—*Atriplex* should be divided into two subgenera; one covering the Section *Dichospermum* Dumort. and the other Section *Teutliopsis* Dumort. (with four subsections).

The species *Obione pedunculata* (L.) Moq. is so strictly related to the genus *Atriplex* that its separation seems unjustified and it should revert to *Atriplex pedunculata* L.

The genus *Chenopodium* should be divided into four sections, 1. *Chenopodia* C.A.M. with five subsections, 2. *Agathophyton* (Moq.) Benth. & Hook., 3. *Ambrina* Benth. & Hook. and 4. A section that may be called *Blitum*.

C. botrys L. and *C. foetidum* Schrad. are not specifically distinct and the latter should be treated as a variety of the former.—[D.H.K.]

154. Chenopodium. Cumming, B. G., 1959, Extreme sensitivity of germination and photoperiodic reaction in the genus Chenopodium (Tourn.) L., *Nature*, **184**, 1044-1045.

155/1. Beta vulgaris subsp. maritima (L.) Thell. Hansen, A. & Pedersen, A., 1959, Noter om dansk flora og vegetation. 8, Spredningen af Strand-bede (Beta maritima); det danske-svenske område, *Flora og Fauna*, **65**, 82-86. The dispersal and spread of *Beta vulgaris* subsp. *maritima* along the coasts of Denmark and Sweden is discussed and illustrated by a map.—[D.H.K.]

166/2. Linum usitatissimum *L.* Colhoun, J., 1959, Flax as an economic plant, *Penguin New Biol.*, **27**, 7-26.

168/2. Geranium sylvaticum L. Pawlowski, S., 1958, O polskich odmianich Geranium silvaticum L., *Fragm. Flor. Geobot.*, **3**, 139-152. A study on the variation of *Geranium sylvaticum* in Poland.—[D.H.K.]

170. Oxalis. Ingram, J., 1959, The cultivated species of Oxalis. 2. The acaulescent species, *Baileya*, **7**, 11-23.

171/4. Impatiens glandulifera Royle. Verhey, C. J., 1958, Impatiens glandulifera Royle op het eiland van Dordrecht, *Correspondentieblad*, **7**, 78-79.

171/4. Impatiens glandulifera Royle. Wintrebert, J., 1957, Sur un peuplement d'Impatiens roylei Walp. en Haute-Saône, *Ann. Sci. Univ. Besan., Bot.*, **9**, 185.

171/4. Impatiens glandulifera Royle. See 320/19. Polygonum cuspidatum Sieb. & Zucc.

187/1. Ulex europaeus L. Gehu-Franck, J., 1959, Répartition du calcium chez l'Ulex europaeus L. en fonction du substratum, *Bull. Soc. Bot. France*, **106**, 8-12. Examination of calcium content in the soil and in specimens from various localities in northern France tends to show that *Ulex europaeus* is not so calcifuge as usually stated but is merely indifferent to calcium.—[E.B.B.]

190. Medicago. Sinskaya, H. N. & Maleyeva, Z. P., 1959, Ploidy in perennial species of Medick (Medicago), *Bot. Zhurn.*, **44**, 1103-1113 (in Russian).

191. Melilotus. See 192/T. Trigonella.

192/2. Trifolium pratense L. Stoddart, J. L., 1959, Floral initiation and its relationship to growth stage in red clover (Trifolium pratense L.), *Nature*, **184**, 559.

192/10. Trifolium striatum L. See 192/24. T. micranthum Viv.

192/18. Trifolium repens L. Bos, I. L., 1959, De neksonbezemvirusziekte van witte klaver, *Natura*, **56**, 74-80.

192/24. Trifolium micranthum Viv. Ploeg, D. T. E. Van der, 1958, Trifolium micranthum Viv. en T. striatum L. in Friesland, *Correspondentieblad*, **11**, 123-124.

192/T. Trigonella. Bhattacharyya, N. K., 1958, A comparative study of the cytology of a few species of two allied genera, Trigonella and Melitotus, *Caryologia*, **11**, 165-180. Studies on *Trigonella foenum-graecum*, *Melilotus indica* and *M. alba*.—[D.H.K.]

210/1. Filipendula vulgaris Moench. Westhoff, V. & Leeuwen, C. G. van, 1957, Filipendula vulgaris Moench teruggevonden bij Gennep, *Correspondentieblad*, **6**, 74.

211. Rubus. Haskell, G., 1959, Selected, correlated responses and speciation and subsexual Rubus, *Genetica*, **30**, 240-260.

212/12. Potentilla crantzii (Crantz) G. Beck ex Fritsch. Ratcliffe, D A., 1959, Potentilla crantzii (Crantz) Beck in the Stewartry of Kirkcudbright (v.c. 73), *Trans. & Proc. Bot. Soc. Edinb.*, **37**, 288-289. A colony of *Potentilla crantzii* has been found growing sparingly on shattered cliffs of calcareous shale between 1,100 and 1,600 feet in the Lamachan Hill area, a few miles west of Clatteringshaws Reservoir. The only other stations for this plant in southern Scotland are on the Moffat Hills in Dumfriesshire. Lists of associated species are given. —[D.H.K.]

212/14. POTENTILLA ANGLICA Laichard. Monachino, J., 1959, Potentilla anglica in New York, *Rhodora*, **61**, 152-155.

215. FRAGARIA. Thompson, P. A. & Gutteridge, C. G., 1959, Effect of gibberellic acid on the initiation of flowers and runners in the strawberry, *Nature*, **184**, B.A. 72-73.

215/1. FRAGARIA VESCA L. Dahlgren, K. V. O., 1959, Pfropf-und Vererbungsversuche mit Fragaria vesca f. micrantha, *Svensk Bot. Tidsk.*, **53**, 293-298. An account of grafts and genetical experiments with *Fragaria vesca* f. *micrantha*, a plant with very small petals, not in contact with each other, and possessing short, always concave, sepals, but normal epicalyx segments.—[D.H.K.]

216. GEUM. Gajewski, W., 1959, Evolution in the genus Geum, *Evolution*, **13**, 378-388. Data on morphological characters, geographical distribution, chromosome numbers, crossability between species, hybrid fertility, chromosome homology and inheritance of the interspecific differences of different species and hybrids in the genus *Geum* L. are presented and are used to trace the evolution story of the group studied. The results indicate that the genus *Geum* is a polyploid complex with many groups of species representing different evolutionary stages.—[Author's summary.]

217. DRYAS. Porsild, A. E., 1959, Dryas babingtoniana, nom. nov. An overlooked species of the British Isles and Western Norway, *Nat. Mus. Canada Bull.*, **160**, 133-148. The author considers *Dryas octopetala* var. *pilosa* Bab. to be a distinct species and names it **D. babingtoniana.** He gives records for the following vice-counties: 64 [65?], 83-90, 92, 105, 108, H.9, H.15, H.16, H.29 and H.33. A map shows the distribution of *D. babingtoniana* and *D. octopetala* sens. lat. —[A.E.W.]

217/1. DRYAS OCTOPETALA L. Watson, R. F., 1959, Dryas octopetala, *Gard. Chron.*, **146**, 19.

218/2. AGRIMONIA ODORATA (Gouan) Mill. Ploeg, D. T. E. Van der, 1958, Agrimonia odorata (Gouan) Mill. in Friesland, *Correspondentieblad*, **7**, 77-78.

221. APHANES. Hjelmqvist, H., 1959, Studien über Embryologie und Variabilität bei einigen Aphanes-Arten, *Bot. Not.*, **112**, 17-64.

226. PRUNUS. Hrabetova-Uhrova, A., 1959, O vegetačnich pomerech na Hustopečsku s prispěvkem k taxonomii některých keru, *Acta Acad. Sci. Cechoslov. Bas. Brun.*, **30**, 221-280. A taxonomic account of the shrubs of Czechoslovakia, including detailed accounts of the varieties and forms of *Prunus* and *Crataegus* species.—[D.H.K.]

229. CRATAEGUS. See 226. PRUNUS.

233. PYRUS. Wagenbreth, A.-N., 1959, Das Vorkommen zweier Flavonoidgarnituren in der Gattung Pyrus, *Flora*, **147**, 164-166.

235. SEDUM. Banach-Pogan, E., 1959, Badania cytologiczne nad trzema gatunkami rodzaju Sedum L., *Acta Biol. Cracov.*, Sér. Bot., **2**, 91-101. Cytological studies on *Sedum rosea* (L.) Scop., $2n=22$; *S. maximum* (L.) Hoffm., $2n=48$ and *S. telephium* subsp. *fabaria* Syme, $2n=24$, in Poland.—[D.H.K.]

235/2. SEDUM TELEPHIUM L. Humphries, E. C. & Thurston, J. M., 1959, Bulbil formation in Sedum telephium, *Nature*, **183**, 1343-1344. A plant of *Sedum telephium* in a vegetative state was collected at Rothamsted, Herts, on 9 June 1958 and placed in a jar of tap water. After three months it was noticed that although the plant had failed to flower, bulbils had formed in the axils of the upper leaves.

Each bulbil bore scale leaves and numerous white roots and when removed from the parent plant and placed on damp filter paper each readily developed into a new plant.—[D.H.K.]

239/1. SAXIFRAGA NIVALIS L. Quézel, P., 1959, A propos du Saxifraga nivalis L. des Monts Dores, *Bull. Soc. Bot. France*, **105**, 524-526. The re-discovery of a herbarium specimen of *Saxifraga nivalis* var. *tenuis* collected by Battandier in 1868 confirms the existence of the species in the Monts Dores. It is suggested that careful search might reveal its presence there to-day.—[E.B.B.]

243/1. PARNASSIA PALUSTRIS L. Cunnell, G. J., 1959, The arrangement of sepals and petals in Parnassia palustris L., *Ann. Bot.*, **91**, 448-453.

251/1. DAPHNE MEZEREUM L. Pettersson, M., 1959, The advent in Ireland of greenfinch despoliation of Daphne, *Irish Nat. J.*, **13**, 78-79.

253/1. LUDWIGIA PALUSTRIS (L.) Ell. Tralau, H., 1959, Pflanzengeographische Studie über Ludwigia palustris, *Flora*, **147**, 123-132.

254. EPILOBIUM. Lawalrée, A., 1959, Contribution à l'étude des Epilobium hybrides de Belgique, *Bull. Jard. Bot. Bruxelles*, **29**, 55-60. The distribution in Belgium of ten hybrids of *Epilobium* is given in some detail. The general distribution is noted and all occur in the British Isles. The hybrids are:—

E. × *borbasianum* Hausskn. (*E. adnatum* × *roseum*).
E. × *dacicum* Borbás (*E. obscurum* × *parviflorum*).
E. × *goerzii* Rubner (*E. hirsutum* × *roseum*).
E. × *mutabile* Boiss. & Reut. (*E. montanum* × *roseum*).
E. × *palatinum* F. W. Schultz (*E. lamyi* × *parviflorum*).
E. × *persicinum* Reichb. (*E. parviflorum* × *roseum*).
E. × *rivulare* Wahlenb. (*E. palustre* × *parviflorum*).
E. × *schmidtianum* Rostk. (*E. obscurum* × *palustre*).
**E.* × *subhirsutum* Genn. (*E. hirsutum* × *parviflorum*).
E. × *weissenburgense* F. W. Schultz (*E. adnatum* × *parviflorum*).

[*NOTE.—The name *E.* × *subhirsutum* is not given in Dandy, *List of British Vascular Plants*, for this particular hybrid.—E.B.B.]

254/12. EPILOBIUM ALSINIFOLIUM Vill. Tralau, H., 1959, Zur Kenntnis von Epilobium alsinifolium und Myosotis silvatica subsp. frigida, *Phyton*, **8**, 74-92.

256. OENOTHERA. Brown, M. J. Jefferson-, 1959, Some Oenotheras, *Gard. Chron.*, **146**, 27.

256/4. OENOTHERA PARVIFLORA L. Hansen, A. & Pedersen, A., 1959, Noter om dansk flora og vegetation. 3, Klit-natlys (Oenothera ammophila Focke) forekomst i Danmark, *Flora og Fauna*, **65**, 77-78.

The distribution of *Oenothera parviflora* in Denmark is discussed and its extra-European distribution outlined.—[D.H.K.]

256. OENOTHERA. Schötz, F., 1958, Periodische Ausbleicklagserscheinungen des Laubes bei Oenothera, *Planta*, **52**, 351-392.

257. FUCHSIA. Henderson, M., 1959, Fuchsias from Arran, *Gard. Chron.*, **146**, 74.

272. ERYNGIUM. Anderson, A. W., 1959, The sea hollies, *Gard. Chron.*, **145**, 379.

286/2. PETROSELINUM SEGETUM (L.) Koch. Visser, A. de, 1958, Petroselinum segetum (L.) Koch in de Zwarte Polder, *Correspondentieblad*, **10**, 105-106.

305/1. SELINUM CARVIFOLIA (L.) L. Westhoff, V., 1956, Selinum carvifolia L. bij Apeldoorn, *Correspondentieblad*, **1**, 4.

309/2. PEUCEDANUM PALUSTRE (L.) Moench. Harris, S. K., 1959, Peucedanum palustre, an interesting addition to the flora of Essex County, Massachusetts, *Rhodora*, **61**, *Peucedanum palustre* was found growing as an adventive in Essex County, Mass., in July 1958. It is new to N. America, though its mode of introduction is unknown.—[D.H.K.]

311. HERACLEUM. Gawlowska, M., 1957, Badania nad rozmieszczenium Heracleum sphondylium L. i H. sibiricum L. w Polsce, *Fragm. Flor. Geobot*, **3**, 61-68. Studies on the distribution of *Heracleum sphondylium* and *H. sibiricum* in Poland.—[D.H.K.]

311/2. HERACLEUM MANTEGAZZIANUM Somm. & Levier. Ingwersen, W., 1959, Heracleum mantegazzianum, *Gard. Chron.*, **145**, 321.

313/1. LASER TRILOBUM (L.) Borkh. Eberle, G., 1958, Der Rosskümmel, *Natur und Volk*, **88**, 188-193. An ecological account of *Laser trilobum* in Germany.—[D.H.K.]

319/15. EUPHORBIA ESULA L. Bakshi, T. S. & Coupland, R. T., 1959, An anatomical study of the subterranean organs of Euphorbia esula in relation to its control, *Canad. J. Bot.*, **37**, 613-620.

320. POLYGONUM. Hansen, A. & Pedersen, A., 1959, Polygonum oxyspermum og P. raii i Danmark, *Bot. Tidssk.*, **55**, 53-57.

320. POLYGONUM. Pauwels, L., 1959, Etudes critiques sur quelques Polygonum de Belgique, *Bull. Soc. Roy. Bot. Belg.*, **91**, 291-297. Methods for studying chromosomes of *Polygonum* are outlined and critical accounts given for *P. raii*, *P. aviculare* (*P. heterophyllum* Lindm.), *P. aequale* and a probable hybrid between *P. lapathifolium* subsp. *nodosum* and *P. mite*. $2n=40$ is given for *P. raii* and *P. aequale*.

A short list of chromosome numbers for some other species of *Polygonum* in Belgium shows that they correspond with numbers for those species in other countries.—[E.B.B.]

320/19. POLYGONUM CUSPIDATUM Sieb. & Zucc. Maas, I. F. M., 1957, Enkele staandplaatsgegevens betreffende Polygonum cuspidatum en Impatiens glandulifera op de velwezoom, *Correspondentieblad*, **6**, 70-71.

321/1. FAGOPYRUM ESCULENTUM Moench. Yelagin, I. N., 1959, On the problem of the origin of buckwheat, *Bot. Zhurn.*, **44**, 1177-1181 (in Russian).

322/1. Koenigia islandica L. Ratcliffe, D., 1959, The habitat of Koenigia islandica L. in Scotland, *Trans. & Proc. Bot. Soc. Edinb.*, **37**, 272-275.

325. Rumex. Fröhlich, A. & Švetka, F., 1957, Rumex limosus Thuill. (R. paluster Sm.) neni identicky s Misencem Rumex conglomeratus Murr. × R. maritimus L., *Čas. Morav. Mus.: Sci. Nat.*, **42**, 65-66.

326. Parietaria. Paclt, J., 1959, Über die Variabilität von Parietaria officinalis, *Phyton*, **8**, 171-174.

327/1. Helxine soleirolii Req. Florschütz, P. A., 1958, L'Helxine soleirolii Req. au Portugal, *Agron. Lusit.*, **20**, 197-198. *Helxine soleirolii* has become established as an escape from cultivation in Portugal.—[D.H.K.]

337. Carpinus. Jentys-Szaferowa, J., 1958, The genus Carpinus in Europe in the Paleobotanical literature, *Monogr. Bot.* (Poland), **7**, 4-59.

340/1. Castanea sativa Mill. Kientzler, L., 1959, Cas d'hermaphroditisme chez le Chataignier, *Bull. Soc. Bot. France*, **106**, 211-212. Some flowers of *Castanea sativa* gathered in 1958 on the roadside near St. Sevrier were found to be hermaphrodite instead of monoecious.—[E.B.B.]

341/1. Quercus cerris L. Corillion, R., 1958, Sur l'extension du Quercus cerris L., sur la côte d'Emeraude, *Bull. Lab. Marit. Dinard*, **44**, 36-38. A note on the recent rapid spread of *Quercus cerris* from its original planted stations on the northern coast of France.—[E.B.B.]

341/4. Quercus petraea (Mattuschka) Liebl. Clason, A. T., 1957, Quercus petraea (Matt.) Liebl. in Nederland, *Correspondentieblad*, **4**, 43-46.

341/4. Quercus petraea (Mattuschka) Liebl. Rompaey, E. Van, 1957, Quercus petraea in België, *Correspondentieblad*, **5**, 61-62.

341/4. Quercus petraea (Mattuschka) Liebl. Corillion, R., 1958, Stations littorales du Quercus sessiliflora Salisb. (Chêne sessile), *Bull. Lab. Marit. Dinard*, **44**, 53-54. Unusual coastal stations for *Quercus petraea* in Brittany and particularly the Côtes-du-Nord are given and discussed.—[E.B.B.]

343. Salix. 'B.M.H.', 1959, Some notes on lowland willows, *Wild Fl. Mag.*, **325**, 19-21.

343. Salix. Raup, H. M., 1959, The willows of Boreal Western America, *Contrib. Gray Herb.*, **185**, 3-95. Gives keys and descriptions of the willows of north-west America.—[D.H.K.]

343. Salix. Simpson, F. W., 1959, Suffolk willows, *Trans. Suffolk Nat. Soc.*, **11**, 159-162.

350/1. Andromeda polifolia L. Bawden, H. E., 1959, Andromeda polifolia, *Gard. Chron.*, **145**, 87.

353/1. Arbutus unedo L. Lami, R., 1958, A propos du bois d'Arbousiers de Coat Hermit en Plourivo (Côtes-du-Nord), *Bull. Lab. Marit. Dinard*, **44**, 39-46. The opinion is given that the strawberry-tree is not spontaneous in this situation, but its introduction is due to monks, as in other northern localities and in Ireland. Its recorded distribution in these areas corresponds with the sites of old monasteries and hermitages.—[E.B.B.]

367→ PRIMULACEAE. Pankow, H., 1959, Histogenetische Untersuchungen an der Plazenta der Primulaceen, *Ber. Deutsch. Bot. Ges.*, **72**, 111-122.

371/1. TRIENTALIS EUROPAEA L. Leeuwen, W. M. D. Van, 1957, Trientalis europaea L., *Correspondentieblad*, **5**, 56-57.

376/1. FRAXINUS EXCELSIOR L. Bovet, J., 1958, Contribution à l'étude des "races écologiques" du frêne, Fraxinus excelsior L., *J. Forest. Suisse*, **8/9**, 536-546. Differences in morphology of the ash growing in damp, rich habitats and in dry, poor soil in the Jura are insufficient to warrant the assumption of two "ecological races". Cytological research bears this out.—[E.B.B.]

376/1. FRAXINUS EXCELSIOR L. Wardle, P., 1959, The regeneration of Fraxinus excelsior in woods with a field layer of Mercurialis perennis, *J. Ecol.*, **47**, 483-497.

385/3. GENTIANELLA AMARELLA (L.) Börner. Corillion, R., 1958, Gentiana amarella (L.) Sm. sur le littoral oriental de la baie de Saint-Breuc, *Bull. Lab. Marit. Dinard*, **44**, 52-53. The distribution of *Gentianella amarella*, with recent finds, in its limited coastal zone is discussed. *G. uliginosa* should be searched for in some areas.—[E.B.B.]

385/3. GENTIANELLA AMARELLA (L.) Börner. Robyns, A., 1959, Gentianella amarella (L.) Börner en Belgique, *Bull. Soc. Roy. Bot. Belg.*, **91**, 283-290. The Belgian plant of this species is *Gentianella amarella* subsp. *uliginosa* (Willd.) A. Robyns, published here as a comb. nov. The subspecies is differentiated mainly by the elliptic to elliptic-oblong basal leaves, while the species has spathuliform leaves. A detailed description is given together with distribution, illustrated by a map.—[E.B.B.]

400. MYOSOTIS. Verbeeck, G., 1959, Some remarks on the small-flowered forget-me-nots, *Acta Bot. Neerl.*, **8**, 330-337.

400/7. MYOSOTIS SYLVATICA Hoffm.—See 254/12. EPILOBIUM ALSINIFOLIUM.

415/1. DATURA STRAMONIUM L. Fitter, R., 1959, From medicine to melodrama, *The Observer*, 18 October 1959, 11. An account of *Datura stramonium* in Britain.—[D.H.K.]

415/1. DATURA STRAMONIUM L. Hyams, E., 1959, Poisons in the garden, *Ill. London News*, **235**, 502. Gives an account of *Datura stramonium* and other poisonous plants.—[D.H.K.]

415/1. DATURA STRAMONIUM L. Kent, D. H., 1959, The poisonous thorn apple, *Country Life*, **126**, 489. A short account of *Datura stramonium* and its history in Britain.—[D.H.K.]

415/1. DATURA STRAMONIUM L. Perring, F., 1959, American Thorn-apple, *The Times*, 10 October 1959, 7. Provides a map of the distribution of *Datura stramonium* in Britain plotted from records since 1950, and points out that apart from one isolated record from Cumberland the species has not been reported further north than Lancashire and the West Riding. It is suggested that the warm summer has enabled the plant to come to maturity further north than usual.—[D.H.K.]

416→ SCROPHULARIACEAE. Hartl, D., 1959, Das alveolierte Endosperm bei Scrophulariaceen, seine Entstehung, Anatomie und taxonomische Bedeutung, *Beitr. Biol. Pflanz.*, **35**, 95-110.

418/1. ANTIRRHINUM MAJUS L. Sampson, D. R. & Hunter, A. W. S., 1959, Inheritance of shades of bronze and pink flowers of Antirrhinum majus, *Canad. J. Plant Sci.*, **39**, 329-341.

418/1. ANTIRRHINUM MAJUS L. Wild, A., 1959, Untersuchung zweir albomakulater Linien von Antirrhinum majus auf ihr Verhalten in Teilreaktionen der Phytosenthese, *Beitr. Biol. Pflanz.*, **35**, 137-175.

420/3 × 4. LINARIA REPENS × VULGARIS. Ooststroom, S. J. Van & Reichgelt, T. J., 1958, Linaria repens (L.) Mill. × L. vulgaris Mill., *Correspondentieblad*, **10**, 108-109.

430/18. VERONICA PRAECOX All. Merker, H., 1959, Veronica praecox All., ett skänskt åkerogräs, *Bot. Not.*, **112**, 380-384.

430/24. VERONICA FILIFORMIS Sm. Hansen, A. & Pedersen, A., 1959, Noter om dansk flora og vegetation. 9, Nyt kort over udbredelsen af Tråd-ærenpris (Veronica filiformis Sm.) i Danmark, *Flora og Fauna*, **65**, 86-87. A new map of the known distribution of *Veronica filiformis* in Denmark is given.—[D.H.K.]

434. MELAMPYRUM. Jasiewicz, A., 1958, Polskie gatunki rodzaju Melampyrum L., *Fragm Flor. Geobot.*, **3**, 17-120. An extensive revision of the genus *Melampyrum* in Poland.—[D.H.K.]

442. UTRICULARIA. Kurz, L., 1959, Anatomische und entwicklungsphysiologische Untersuchungen an Utricularia, *Beitr. Biol. Pflanz.*, **35**, 111-135.

445/3. MENTHA ARVENSIS L. Hegnauer, R. & Jong, J. I. M. de, 1958, Über das ätherische Öl mitteleuropäischer Mentha arvensis L., *Pharm. Acta Helvet.*, **31**, 367-382. Studies on the volatile oils obtained from *Mentha arvensis* and its hybrids.—[D.H.K.]

460/1. BALLOTA NIGRA L. Kruseman, G., 1959, Ballota nigra L. aux Pays-Bas, *Acta Bot. Neerl.*, **8**, 269-270. *Ballota nigra* subsp. *foetida* is frequent in the Netherlands and must be considered native, whereas *B. nigra* subsp. *nigra* is local and obviously adventive.—[E.B.B.]

462/5. LAMIUM ALBUM L. Sylven, N., 1959, Heloch flikbladsformer av Lamium album L., *Bot. Not.*, **112**, 113-117.

462/6. LAMIUM MACULATUM L. Chevassus, P., 1957, A propos du Lamium maculatum L. f. lacteum Wallr., *Ann. Sci. Univ. Besan., Bot.*, **9**, 186-188.

469/4. SCUTELLARIA ALTISSIMA L. Retz, B. de, 1958, Scutellaria altissima L. en Forêt de Fontainebleau, *Cahiers des Nat.*, **14**, 76.

469/4. SCUTELLARIA ALTISSIMA L. Berrier, L., 1959, A propos de Scutellaria altissima L., *Cahiers des Nat.*, **16**, 34.

474/1. WAHLENBERGIA HEDERACEA (L.) Reichb. Eberle, G., 1957, Das Efeublattrige Moorglöckchen, *Natur und Volk*, **87**, 310-313. An ecological account of *Wahlenbergia hederacea* in Germany.—[D.H.K.]

495/1. VALERIANA OFFICINALIS L. Hegnauer, R. & Meijers, T., 1958, Valeriana officinalis L. in Holland, *Planta Medica*, **6**, 349-372. *Valeriana officinalis* is a very variable species and has received different taxonomic treatment in various countries. A short review of the pertinent literature is given.

The authors investigated the species in the Netherlands by cultivating plants from many parts of the country and by examining specimens in the Rijksherbarium at Leiden. Macromorphological, micromorphological and numerical characters were used in the study and 55 plants were examined cytologically. Comparison was also made with material from Sweden, Poland, Germany and Luxemburg. All Dutch plants were found to be octoploid with $2n = 56$.

As a result of the investigation the authors consider that if the whole range of the distribution of *V. officinalis* is taken into consideration the morphological variation is insufficient for the creation of a number of microspecies. They suggest, instead, that there may be a case for the creation of geographical subspecies.—[D.H.K.]

495/1. VALERIANA OFFICINALIS L. Meijers, T., 1957, *Een Onderzoek van het Linneon Valeriana officinalis L. in Nederland.* Pp. 1-112 + 23 photographs. S'Gravenhage. A detailed account of studies on *Valeriana officinalis* in the Netherlands. The taxonomic literature on the complex in the British Isles, France, Switzerland, Belgium, Germany, Poland, Scandinavia, Russia and the U.S.A. is reviewed at length.—[D.H.K.]

495/1. VALERIANA OFFICINALIS L. Skalińska, M., 1958, Badania nad kariologicznym roznicowaniem tapetum u Valeriana officinalis L., *Acta Biol. Cracov., Sér. Bot.*, **1**, 45-54.

502. BIDENS. Debray, M. & Thonet, V., 1958, Observations nouvelles sur le genre Bidens dans la région parisienne, *Cahiers des Nat.*, **14**, 105-109. Distribution in the Paris area is given of four species of *Bidens*: *B. connata*, *B. frondosa*, *B. radiata* and *B. pilosa* and one hybrid *B.* × *garumnae* (*B. frondosa* × *tripartita*). Some descriptive and ecological notes are also given.—[E.B.B.]

504/1. AMBROSIA ARTEMISIIFOLIA L. Kovačevic, J., 1957, Rasprostranjenoset sjevereoameričkeg korova limundžiha (Ambrosia artemisiifolia L.) u korovskrm fitocenozama Srednje Podravine, *Godisnjak*, **10**, 173-176. The North American species *Ambrosia artemisiifolia* has become widespread in the areas of Yugoslavia around the Danube, and is now a common weed of crops. It frequently appears also alongside railway tracks, roads and paths and near houses.—[D.H.K.]

504/1. AMBROSIA ARTEMISIIFOLIA L. Vasilyiev, D. S., 1959, Some data of the Ambrosia artemisiifolia L. biology, *Bot. Zhurn.*, **44**, 843-846 (in Russian).

506. SENECIO. Bakker, D., 1957, Einige opmerkingen over Senecio aquaticus Huds., S. barbaraeifolius Krocker en S. erraticus Bertol., *Correspondentieblad*, **4**, 47-51.

509/1. PETASITES HYBRIDUS (L.) Gaertn., Mey. & Scherb. Jongh, S. E. de, 1956, Petasites hybridus (L.) G., Mer. & S., *Correspondentieblad*, **1**, 7-8.

521. ERIGERON. Huziwara, Y., 1958, Karotype analysis in some genera of Compositae 6. The chromosomes of some Erigeron species, *Karyologia*, **11**, 158-164.

525. EUPATORIUM. Lawalrée, A., 1959, Eupatorium rugosum Houtt. t Echinops commutatus Jaratzka adventices en Belgique, *Rev. Verv. Hist. Nat.*, **16**, 22-24.

528. ACHILLEA. Ehrendorfer, F., 1959, Achillea rosea-alba Ehrendf. pec. nov. eine hybridogene di-und tetraploide Sippe des Achillea millefolium-Komplexes, *Österr. Bot. Zeitschr.*, **106**, 363-368.

528. ACHILLEA. Ehrendorfer, F., 1959, Spontane Chromosomenaberrationen und andere Meiosestörungen bei diploiden Sippen des Achillea millefolium-Komplexes, Zur Phylogenie der Gattung Achillea, 2, *Chromosoma*, **10**, 365-406: Spindeldefekte mängelhufte Zellwardbildung und andere Meiosestörungen bei polyploiden Sippen des Achillea millefolium-Komplexes, Zur Phylogenie der Gattung Achillea, 3, *op. cit.*, **10**, 461-481: Unterschiedliche Störungssyndrome der Meiose bei diploiden und polyploiden Sippen des Achillea millefolium-Komplexes und ihre Bedeutung für die Mikro-Evolution, Zur Phylogenie der Gattung Achillea, 4, *op. cit.*, **10**, 482-496.

534/1. COTULA CORONOPIFOLIA L. Hansen, A. & Pedersen, A., 1959, Noter om dansk flora og vegetation, 2, *Flora og Fauna*, **65**, 73-77. The distribution of *Cotula coronopifolia* in Denmark is discussed and illustrated by a map.—[D.H.K.]

544/9. CENTAUREA CALCITRAPA L. Leeuwen, C. G. Van, 1958, Het verdwijnen van Centaurea calcitrapa uits ons land, *Correspondentieblad*, **9**, 97.

544/9. CENTAUREA CALCITRAPA L. Ooststroom S. J. Van, & Reichgelt, T. J., 1957, Is Centaurea calcitrapa L. in Nederland uit gestorven?, *Correspondentieblad*, **6**, 71, 72.

552. TRAGOPOGON. Kern, J. H., 1957, Tragopogon dubius Scop. in Nederland, *Correspondentieblad*, **2**, 17.

556. SONCHUS. Boulos, L., 1959, Cytotaxonomic studies on the genus Sonchus. 1. Sonchus gigas Boulos nov. sp., a new tetraploid Egyptian species, *Bot. Not.*, **112**, 363-368. Six species of *Sonchus* are recorded from Egypt, *S. oleraceus*, *S. asper*, *S. maritimus*, *S. nymanni*, *S. arvensis*, and *S. tenerrimus*. The author has not yet seen authentic material of the last three and the records may need revision.

S. oleraceus is the most widespread, *S. asper* is less widely spread and *S. maritimus* has a very limited distribution, being confined to the oases and the district around Suez.

A new species, *S. gigas*, closely related to *S. asper*, is described from the Nile Delta.—[D.H.K.]

557/1. CICERBITA ALPINA (L.) Wallr. Ratcliffe, D. A., 1959, Cicerbita alpina (L.) Wallr. in Glen Callater, *Trans. & Proc. Bot. Soc. Edinb.*, **37**, 287-288.

558/1 (191). HIERACIUM STEWARTII (F. J. Hanb.) Roffey. Stelfox, A., 1959, Hieracium stewartii in the Galtee Mountains, South Tipperary, *Irish Nat., J.*, **13**, 44.

560. TARAXACUM. Malecka, J., 1958, Liczby chromosomów niektórych polskich gatunkow Taraxacum, *Acta Biol. Cracov.*, Ser. Bot., **1**, 55-56. Chromosome numbers are given for some Polish species of *Taraxacum*.—[D.H.K.]

560. TARAXACUM. Van Soest, J. L., 1959, Alpine species of Taraxacum with special reference to the central and eastern alps, *Acta Bot. Neerl.*, **8**, 77-138.

561→ ALISMATACEAE. Hartog, C. den, 1959, Notites over Nederlandse Alismataceae, *Correspondentieblad*, **12**, 126-128.

563. ALISMA. Björkqvist, I., 1959, Studium av släktet Alisma L., *Bot. Not.*, **112**, 377-380.

565/2. SAGITTARIA LATIFOLIA Willd. Sykes, W., 1959, Sagittaria latifolia, *Gard. Chron.*, **145**, 210.

570/1. ELODEA CANADENSIS Michx. Hansen, A. & Pedersen, A., 1959, Noter om dansk flora og vegetation, 10. Nytkort over udbredelsen af Vandest (Elodea canadensis Michx.); i Danmark, *Flora og Fauna*, **65**, 87-88. A new map of the distribution of *Elodea canadensis* in Denmark is given. The species was first found in the country in 1870 and is now widely distributed in many lakes, ponds, pools, and watercourses. It is, however, still rare or absent in some regions.—[D.H.K.]

591. ASPARAGUS. Bozzini, A., 1959, Revisione citosistematica del genere Asparagus. 1. Le specie di Asparagus della flora italiana e chiave analitica per la loro determinazione, *Caryologia*, **12**, 199-264.

591/1. ASPARAGUS OFFICINALIS L. Vazart, B., 1959, Biologie florale de l'Asperge, Asparagus officinalis L., *Rev. Gen. Bot.*, **66**, 405-418. The study of the floral biology of the *Asparagus* reveals an equal distribution of male and female plants. The female flowers have a uniform structure whilst the males show numerous intermediates. Some are physiologically bisexual. Certain plants could be truly monoecious.—[Author's summary.]

602. COLCHICUM. Feinbrun, N., 1958, Chromosome numbers and evolution of the genus Colchicum, *Evolution*, **12**, 173-188.

603/1. PARIS QUADRIFOLIA L. Daumann, E., 1959, Zur Blütenökologie der Finbeere (Paris quadrifolia L.), *Preslia*, **31**, 277-283.

605. JUNCUS. Clifford, H. T., 1959, On putative hybrids between Juncus inflexus and Juncus effusus L., *Kew Bull.*, **1958**, 392-395. A biometrical study of perianth and inflorescence length in *Juncus effusus*, *J. inflexus* and their putative hybrid has been undertaken on material in five British herbaria.

These studies indicate that the specimens labelled as putative hybrids are a very heterogeneous group and that some of them closely resemble *J inflexus* that has failed to fruit.

Experimental evidence is produced to show that in *J. inflexus* failure to fruit may often result from unfavourable environmental conditions.—[Author's summary.]

605. JUNCUS. Reichgelt, T. J., 1957, Over de verspreiding van enkele Juncus-soorten, *Correspondentieblad*, **41**, 53.

605/18. JUNCUS ACUTIFLORUS Ehrh. ex Hoffm. Berg, R. & Wischmann, F., 1959, Juncus acutiflorus ny for Norge, *Blyttia*, **17**, 45-52. Herbarium specimens of *Juncus acutiflorus* collected in 1911 in southern Norway were discovered in the Botanical Museum, Oslo and at Bergen. Because of earlier misidentification the importance of these collections were not realised. It is new to Norway. In 1955 the plant was found in a second locality.

A description of the species is given together with its world distribution. A key to the Scandinavian members of the *articulatus* group is also provided.—[D.H.K.]

612/1. GALANTHUS NIVALIS L. Boerboom, J. H. A., 1957, Een andere oude groeiplaats van Galanthus nivalis L.?, *Correspondentieblad*, **5**, 59-60.

612/1. GALANTHUS NIVALIS L. Jongh, S. E. de, 1957, Een waarschijnlijk, zeer oude vindplaats van Galanthus nivalis L., *Correspondentieblad*, **2**, 15-16.

616/4. IRIS PSEUDACORUS L. Rubtzoff, P., 1959, Iris pseudacorus and Caltha palustris in California, *Leafl. West. Bot.*, **9**, 31-32. *Iris pseudacorus* and *Caltha palustris* have been discovered as established adventives in a marsh in Sonoma County, California. The method by which they were introduced is not known.—[D.H.K.]

619/1. ROMULEA COLUMNAE Seb. & Mauri. Ward, D. J. U., 1959, Romulea parviflora, *Gard. Chron.*, **145**, 378.

622/1. TAMUS COMMUNIS L. Eberle, G., 1959, Von der Schmerwurz (Tamus communis L.), *Natur und Volk*, **89**, 420-426.

624→ ORCHIDACEAE. Downie, D. G., 1959, Rhizoctonia solani and orchid seed, *Trans. & Proc. Bot. Soc. Edinb.*, **37**, 279-285.

624→ ORCHIDACEAE. McGregor, A., 1959, Northern orchids, *Countryman*, **56**, 311-314. An account of *Hammarbya paludosa*, *Goodyera repens* and *Corallorhiza trifida* in Scotland.—[D.H.K.]

625/6. EPIPACTIS PHYLLANTHES G. E. Sm. Benoit, P. M., 1959, Epipactis phyllanthes in Merioneth, *Nature in Wales*, **5**, 809-813.

627/1. SPIRANTHES SPIRALIS (L.) Chevall. Nothdurft, H., 1959, Eine mehrjährige Blattrosette bei Spiranthes spiralis, *Beitr. Biol. Pflanz.*, **35**, 24-29.

629. NEOTTIA. See 640. OPHRYS.

630/1. GOODYERA REPENS (L.) R.Br. Gehu, J. M., 1958, Présence de Goodyera repens (L.) R.Br. à Erquy (C.-du-N.), *Bull. Lab. Marit. Dinard*, **44**, 54-55. The discovery of *Goodyera repens* in an old pinetum at Erquy reveals its most westerly French locality.—[E.B.B.]

630/1. GOODYERA REPENS (L.) R.Br. See 1/3. LYCOPODIUM ANNOTINUM.

640. OPHRYS. Metron, J., 1959, Un hybride d'Ophrys nouveau pour le région parisienne en Forêt de Fontainebleau: ×*Ophrys mangini* Tallon, *Assoc. Nat. Fontainebleau*, **35**, 103-104. A description is given of *Ophrys* × *mangini* (*O. apifera* × *fuciflora*) formerly known in the Camargue, but now extinct. The labellum of the hybrid is contrasted with that of *O. apifera* by drawings.—[E.B.B.]

640. OPHRYS. Vermeulen, P., 1959, The different structure of the rostellum in Ophrydeae and Neotticae, *Acta Bot. Neerl.*, **8**, 338-355.

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SCOTLAND.—See 623→ ORCHIDACEAE.

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Evidence is presented to show that virtually all *Ca*-rich substrates in the Highlands are ultimately derived from calcareous or dolomitic rocks. Basic rocks contained a high level of *Ca* in the form of relatively insoluble silicates, and where $CaC0_3$ is absent, have little influence on the calcium status of substrates derived from them. It is shown that wet and dry flushes are associated with hard and soft calcareous rocks respectively.

The marked effect of the *Ca*-rich substrates on the distribution of the montane flora is emphasised and the strong correlation between floristically rich vegetation and soft calcareous rock is pointed out.

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Matthey, F., 1958, Contribution à l'étude de la végétation post-glaciaire de l'étage inférieur du Canton de Neuchâtel, *Bull. Soc. Neuchat. Sci. Nat.*, **81**, 113-118. The pollen-analysis of lacustrine sediments recovered near the Loclat at Saint-Blaise, enables the author to retrace the late-glacial and post-glacial history of the plant life in a region situated at the foot of the Jura of Neuchâtel.—[Author's summary.]

Pigott, M. E. & C. D., 1959, Stratigraphy and pollen analysis of Malham Tarn and Tarn Moss, *Field Studies*, **1**, 84-101.

MISCELLANEOUS

Almen, B. & O., 1959, Kärlväxternas höjdgränser i Sulitelmafjallen, 1. Växtgeografisk översikt, *Bot. Not.*, **112**, 285-312.

Apinis, A. E., 1959, Mapping vegetation, *Nature*, **184**, B.A., 23-25. An account of an international symposium held during March 23-26, 1959, in Stolzenau/Weser, Federal Republic of Germany.—[D.H.K.]

Asker, S., 1959, Flora och vegetation i Malmö, *Bot. Not.*, **112**, 258-284. An investigation of the flora of the city of Malmö, which has more than 200,000 inhabitants, and is situated on the coast of Öresund, southern Sweden, was carried out by the author in 1957 and 1958.

The area consists of densely built-over quarters, gardens, suburbs and cultivated ground. Only small fragments of meadows, fens and original seashore are now left and these are rapidly dwindling. In meadows near the sea *Cerastium subtetrandrum* and *Hordeum secalinum* survive.

The botanical investigation of Malmö since the time of Linnaeus is reviewed.

Many weed species are found especially in the harbour area, those which have spread rapidly in recent years include *Hordeum jubatum*, *Impatiens parviflora*, *Geranium pyrenaicum*, *Calystegia sepium*, *Galinsoga parviflora* and *G. ciliata*.—[D.H.K.]

Baillaud, L., 1959, Recherches sur les mouvements spontanés des plantes grimpantes, *Ann. Sci. Univ. Besançon*, **11**, 5-235. An extensive study of the distribution, anatomy, morphology and behaviour of climbing plants. Among species particularly noted are *Polygonum convolvulus*, *P. dumetorum*, *Lonicera* spp., *Tamus communis*, *Calystegia* spp. and *Cuscuta* spp.—[E.B.B.]

Blangermont, C. de, 1959, Quelques stations de plantes peu communes en forêt d'Eu et vallée de la Bresle, *Rev. Soc. Sav. Haute-Normandie, Sciences*, **13**, 17-21. New records in northern France for uncommon species. *Convallaria majalis* is very rare in the Forêt d'Eu.—[E.B.B.]

Christian, G., 1959, Keeping nature as an ally, *Country Life*, **125**, 1366-1368. An account of the work of the Nature Conservancy.—[D.H.K.]

Clifford, H. T., 1959, Seed dispersal by motor vehicles, *J. Ecol.*, **47**, 311-315. An account of experiments carried out on samples of mud collected from the undersurface of 75 vehicles at University College, Ibadan, Nigeria. Details are given of species which germinated from seed contained in the mud samples.—[D.H.K.]

Cobb, L. E., 1959, The B.S.B.I. Distribution Maps Scheme, *Reading Nat.*, **11**, 37-38.

Dhien, R., 1959, La végétation d'un ruisseau intermittent, *Bull. Soc. Bot. France*, **106**, 25-27. Floristic lists are given of species growing in the bed of a stream which flows only during very rainy periods. A short list of interesting species growing in the area (Côte-d'Or), but not in the stream, is also given.—[E.B.B.]

Durrant, A., 1959, A new facet of the chromosome theory, *New Scient.*, **6**, 293-295. Experimental studies on *Linum usitatissimum* at the University College of Wales, Aberystwyth, have shown that while there is no evidence for Lysenko's claim that "inheritance of acquired characters" is the process by which evolution occurs, environmentally induced changes can, in certain circumstances, be transmitted to F1 plants.—[D.H.K.]

Gillett, J. B., 1958, Ways and means of promoting the production of monographs of families and genera, *Mem. Soc. Brot.*, **13**, 107-111.

Gundersen, K., 1959, Some experiments with gibberellic acid, *Acta Hort. Got.*, **22**, 87-110. Experiments have shown that gibberellic acid will break the dormancy of buds in *Anemone nemorosa* and accelerate stem elongation in that species. Stem elongation in some *Salix* species is also accelerated by treatment with gibberellic acid, though root formation in *S. purpurea* is considerably depressed by it.—[D.H.K.]

Hansen, A., 1959, Om vegetationen på øen Vresen i Storebælt, *Flora og Fauna*, **65**, 1-6.

Hansen, A. & Pedersen, A., 1959, Noter om dansk flora og vegetation. 5, En tømmerplads i Esbjerg Havn, *Flora og Fauna*, **65**, 79-80. An example of the dispersal of plants from a wood to a timberyard in the town of Esbjerg is recorded. The seeds stick in the bark of the trunks. 15 typical woodland plants are noted.—[Authors' summary p.p.]

Harley, J. L., 1959, Mycorrhiza in plants, *New Scient.*, **6**, 930-931.

Hyde, H. A., 1959, Atmospheric pollen in relation to land use, *Nature*, **183**, 1694-1695.

Jain, S. K., 1959, Male sterility in flowering plants, *Bibl. Gen.*, **18**, 103-166.

Kallio, P. & Piiroinen, P., 1959, Effect of gibberellin on the termination of dormancy in some seeds, *Nature*, **183**, 1830-1831, 50 species were treated with gibberellin; of these the substance had a marked effect on the germination of *Luzula parviflora, Trollius europaeus, Erysimum hieraciifolium, Draba hirta, Geranium sylvaticum, Diapensia lapponica* and *Bartsia alpina*.—[D.H.K.]

Lid, J., 1959, The vascular plants of a mountain plateau of southern Norway, *Nytt Mag. Bot.*, **7**, 61-126.

Lindquist, B., 1959, Forest vegetation belts in southern Scandinavia, *Acta Hort. Got.*, **22**, 111-144.

McClintock, D., 1959, Lawn aliens, *Wild Fl. Mag.*, **326**, 10-11. Notes on some of the adventive species which may be found as pests of lawns.—[D.H.K.]

Meijer, G., 1959, The spectral dependence of flowering and elongation, *Acta Bot. Neerl.*, **8**, 189-246.

Natho, G., 1955, Methoden zur Untersuchung von Hybridpopulationen, *Wiss. Zeitschr. Ernst Moritz Arndt.-Univ. Griefswald*, **1954-55**, 489-493.

Nemejc, F., 1959, Notes on the evolution and taxonomy of the stachyospermic gymnosperms, *Preslia*, **31**, 251-272.

Ooststroom, S. J. van & Reichgelt, T. J., 1959, Niewe plantesoorten in Nederland gevonden in 1958 en vrogere jaren, *De Levende Natuur*, **62**, 162-163.

Ooststroom, S. J. van & Reichgelt, T. J., 1959, Nieuwe vondsten van zeldzame planten in Nederland, *De Levende Natuur*, **62**, 182-189.

Ooststroom, S. J. van & Reichgelt, T. J., 1957, Verwilderde en ingeburgerde sierplanten, *Correspondentieblad*, **6**, 68-70. Notes on

Impatiens glandulifera, *Polygonum cuspidatum* and *Rudbeckia laciniata* in Holland.—[D.H.K.]

Rallet, L., 1958, La flore méditerranéenne dans le Centre-Ouest, *Bull. Trim. Fed. Franc. Soc. Sci. Nat.*, **15**, 97-119. The distribution and passage of species of the various sub-elements of the mediterranean flora in central west France are discussed.—[E.B.B.]

Rønning, O. F., 1959, Some upper limits of vascular plants in Spitzbergen, *Blyttia*, **17**, 53-60.

Ruffier-Lanche, R., 1959, Notes de floristique Alpine, *Bull. Soc. Linn. Lyon*, **28**, 261-268. Distributional notes on less common species in the Lautaret area, including *Potamogeton filiformis*, *Carex* spp. and *Utricularia minor*.—[E.B.B.]

Silva, A. R. Pinto da, *et al.*, 1958, Plantas novas e novas áreas par a flora de Portugal, *Agron. Lusit.*, **20**, 217-247. Notes on plants found in Portugal, including *Eriophorum angustifolium*, *Rhynchospora alba*, *Carex punctata*, *Elodea canadensis*, *Amaranthus blitoides*, *Hypericum elodes*, *Melampyrum pratense*, *Bidens pilosa*, *B. frondosa* and *Picris hieracioides*.

A key is given to the species of *Ononis* found in Portugal.—[D.H.K.]

Sporne, K. R., 1959, On the phylogenetic classification of plants, *Amer. J. Bot.*, **46**, 385-394.

Turrill, W. B., 1959, Botany and horticulture, *J. Roy. Hort. Soc.*, **84**, 328-332.

Tutin, T. G., 1960, Centenary of "The Origin of Species", some botanical aspects, *Nature*, **185**, 216-217. An account of the B.S.B.I. Conference held in London in November 1959.—[D.H.K.]

Villeret, S., 1959, Recherches hydrobiologiques sur les etangs calcaires de la forêt de Haute-Sève (Ille-et Vilaine), *Bull. Soc. Sci. Bretagne*, **33**, 65-89. A detailed study of the physico-chemical constitution of calcareous ponds of which the aquatic phanerogamic flora includes *Myriophyllum verticillatum*, *Phragmites communis*, *Utricularia vulgaris*, *Ceratophyllum demersum*, *Hottonia palustris* and *Carex* spp. Species of *Chara* are also noted and a few lists of Algae given.—[E.B.B.]

Wright, S., 1959, Genetics, the gene and the hierarchy of biological sciences, *Proc. 10th Intern. Congr. Genetics*, **1**, 475-489.

EXHIBITION MEETING, 1959

An Exhibition Meeting was held at the British Academy, Burlington Gardens, London, W.1, on Saturday, November 28, 1959, from noon to 5.30 p.m.

About 250 members and guests attended, and exhibits were arranged by 8 individuals. A further 13 special exhibits were displayed in another room in connection with the Darwinian Centenary Conference, and details of these will be given in the Report of the Conference to be published later. An account of the non-Darwinian exhibits, based on notes supplied by exhibitors, is given below.

HERBARIA ADOPTION SCHEME

Information was given and notices displayed regarding the progress of the Herbaria Adoption Scheme.—Miss W. M. A. BROOKE.

PLANTS FROM CHURCHILL, MANITOBA

The exhibit consisted of herbarium material and photographs from Fort Churchill, Canada, showing the variety of vegetation produced in three growing months of the year on ground permanently frosted. Although Fort Churchill is not within the Arctic Circle the conditions on Hudson Bay are similar. Vegetation is quite abundant although the ground lacks many important mineral salts and the cultivation of vegetables is almost impossible.

Unfortunately, the land is rapidly being developed for a new port and the most accessible points from which the flora may be studied will be built over in the next few years.—Miss C. GURNEY.

ALIEN LAWN WEEDS

At least eighteen alien species are reported in mown turf in the British Isles, viz. *Cotula dioica* Hook. f., *C. squalida* Hook. f., *Hydrocotyle moschata* Forst. f., *H. rotundifolia* Roxb., *Nertera granadensis* (L. f.) Druce, *Pratia angulata* Hook. f., *P. arenaria* Hook. f., *Androsace sarmentosa* Wall., *Campanula cochlearifolia* Lam., *Epilobium nerterioides* Cunn., *Helxine soleirolei* Req., *Linaria hepaticifolia* Poir. ex Steud., *L. supina* (L.) Chazelles, *Mentha requenii* Benth., *Oxalis corniculata* L., *Sagina glabra* (Willd.) Fenzl and/or *S. pilifera* (DC.) Fenzl, *Veronica filiformis* Sm. and *V. repens* Clarion ex DC.

Growing plants from lawns of the first seven species were exhibited, together with pots of three of them in their actual sods. Growing specimens were also shown of a pentamerous *Sagina* from Tunbridge Wells, Kent, of *Sibthorpia europaea* L. from a Devon lawn for comparison with the *Hydrocotyle* species, of two other species of *Cotula* which might be found in lawns, of *Dichondra repens* J. R. & G. Forst., from Cornish dunes, which is being tested as a lawn-former in this country, and of *Selliera radicans*, which is used for lawns in New Zealand and is grown in rockeries in Britain.—D. McClintock.

The Flora of Shetland

Plans were announced for a new flora of Shetland and herbarium material was shown illustrating recent discoveries of interest. These included *Lathyrus japonicus* Willd., re-found in Unst after a lapse of 60 years; *Corylus avellana* L. from its first localised Shetland station; and *Poa flabellata* (Lam.) Hook. f., an antarctic grass introduced locally.—R. C. Palmer and W. Scott.

†Results of *ARCTIUM* measurements in 1959

A distribution map of *Arctium lappa* L. suggested that it is confined to the area south and east of a line between the Gower Peninsula and the Vale of York. It also occurs in a few localities in south and east Ireland.

During the summer of 1959 measurements were made of 76 populations of *Arctium* agg., excluding *A. lappa* L. An analysis of head-width data shows that there is no disjunction between the small-headed and large-headed forms; the majority are intermediate in size—between 2·5 and 3·0 cm. However, if the data are divided on a regional basis it appears that in Scotland only large-headed forms (over 3·0 cm.) occur, whereas in the south-west of Britain the small-headed forms predominate and head-sizes larger than 3·0 cm. are very rare. In the south-east and the Midlands all head sizes occur, though in the former area there is a greater percentage of small-headed forms.—F. H. Perring.

JUNCUS ARTICULATUS × *NODULOSUS*

Herbarium specimens were exhibited of the putative hybrid *Juncus articulatus* × *nodulosus* from Loch Ussir, East Ross, v.c. 106, where it was found in two small colonies on the shores of the loch, growing with *J. acutiflorus*, *J. articulatus*, and dwarfed *Molinia caerulea*.—Mrs. B. H. S. Russell.

Grasses from Central Africa

Herbarium specimens, kindly lent by the Director, Royal Botanic Gardens, Kew, were shown of a number of small annual grasses collected by the exhibitor in 1959. These included two recently described genera:—*Richardsiella eruciformis* J. K. O'Byrne & J. Elffers, first found by Mrs. H. M. Richards in 1952 on shallow soil overlying ironstone, near The Plain of Death, Chilongolwelo, Abercorn, Northern Rhodesia, and *Habrochloa bullockii* C. E. Hubbard, collected by A. A. Bullock on a moss-covered bank by the Kalambo Falls, near Abercorn.

Richardsiella was exhibited with 18 of its associate species to show their stunted growth due to the poor soil conditions. A photograph of *Richardsiella* was also displayed to illustrate the horizontal spikes of the inflorescence which curl upwards only when the plant is dried.—Miss M. McCallum Webster.

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†See p. 33.

CIRSIUM ACAULON × PALUSTRE

A herbarium specimen of *Cirsium acaulon* × *palustre* (*C.* × *kirschlegeri* Schultz-Bip.) collected near Bix, Oxfordshire, during a B.S.B.I. Field Meeting in 1951, was shown. At the time, it was taken for caulescent *C. acaulon*, but Dr. W. A. Sledge has recently confirmed the exhibitor's suspicion that it was the above hybrid, which is apparently unrecorded for Britain, although other specimens exist.—D. P. Young.

REPORT OF THE COUNCIL FOR 1959

The report and the audited accounts printed below cover the period from 1st January to 31st December 1959. Comparative figures for 1958 are given in brackets.

During the year 110 (95) new members joined the Society and we lost 158 (127) by reason of death, resignation and the operation of Rule 6 (e). The total membership at the end of the year was 1252 (1300) with a net loss of 48 (loss of 32). We are still feeling the effect of the rise in subscription made in 1958 and some of the members whose interest in the Society was aroused by the Distribution Maps Scheme have not proved to be permanent. We record with great regret the deaths of Dr. R. C. L. Burges, a Vice-President; G. M. Ash, a previous Vice-President; Brother Louis-Arsène, who died a few days before the Annual General Meeting when he would have been elected an Honorary Member, and Dr. Donald Patton, J. R. Lee, and E. Nelmes, old and valued members.

The General Income and Expenditure Account for the year 1959 shows a surplus of £29, but only one part of *Watsonia* was published in the past year. Another factor which has benefited us has been the exceptionally large sales of Journals and old reports.

The resources of the Society have received a special increment by a legacy of £50 from our late member, Miss Parsons. The legacy had to abate by reason of death duties and the amount of £45 actually received has been credited direct to the General Fund.

The Publications Fund has benefited from a grant of £100 from the Royal Society towards the cost of *British Herbaria* and also from unusually large sales of the Society's publications. The only expenditure incurred during the year out of the fund was in respect of prospectuses and advertising expenditure, against which the Society has received a grant of £50 from the Nuffield Foundation, to cover the cost of printing and circulating a brochure to make known our periodical publications overseas, and a donation of £25 from a member, intended specifically to cover the greater part of the cost of Press advertising. It is essential to build up the resources of the Publications Fund in view of the problems which will arise from the financing of the printing and publication of the "Distribution Atlas". Because of this, Council has decided to transfer £750 from the General Income Account to the Publications Fund.

Thus, whilst the finances of the Society have not deteriorated further during 1959, it remains essential to maintain and, if possible, increase the Society's membership in order to avoid any restriction of the present activities of the Society.

The work of the **Publications Committee** (Secretary, P. J. Wanstall) was rendered more difficult by the dispute in the printing industry, which held up the publication of our periodical journals. A supplement to *Proceedings* (Vol. 3, Part 3), *The Flora of Islay and Jura* (59 pages) by J. K. Morton was published with the assistance of a generous grant of £80 by the University College of Ghana. A bibliography of the British flora, compiled by N. D. Simpson, the publication of which we are sponsoring, is now being printed and should be issued in the coming year.

There has been a record sale for our journals and publications and we thank E. B. Bangerter again for having dealt so efficiently with this important side of our work. We express our thanks also to the Trustees of the British Museum (Natural History) for continuing to allow the storage of our publications at the Museum.

A full programme of meetings brought a busy year for the **Meetings Committee** (Secretary, H. J. M. Bowen). History for the Society was made with the Annual General Meeting which was held at the Royal Botanic Garden, Edinburgh (by kind permission of the Regius Keeper). Meetings held in connection with it were organised by the Committee for the Study of the Scottish flora and included lectures by Professor J. R. Matthews, Mr. J. Anthony and Dr. F. H. Perring, a tour of the Royal Botanic Garden and a visit to the Herbarium. Members were the guests of the Botanical Society of Edinburgh at a conversazione in connection with which a number of interesting exhibits were shown.

A very successful two-day conference, held at the British Academy, London, in connection with the centenary of the publication of Darwin's *Origin of Species*, attracted an attendance of over 200 members and friends. The conference was noteworthy, as papers were read by three foreign visitors, Professor T. W. Böcher (Denmark), Professor W. H. Camp (Connecticut, U.S.A.) and Dr. N. Hylander (Sweden). A Soirée to meet these and the other speakers was attended by a hundred members and a conversazione at Crosby Hall, Chelsea, by 84 (70). On the Sunday following the conference, a party of 40 members visited the Museum at Down House (by kind permission of the Royal College of Surgeons) where they were met by Lady Barlow, a speaker at the conference. Following this, a memorial service was held at Downe Church and an address given by the Vicar of Downe (Rev. L. G. Vedy).

The Annual Exhibition Meeting was held during the period of the conference but restricted space allowed only 21 (49) exhibits, more than a half of which related to the subject of the conference.

The programme of field meetings arranged by the Field Secretary (P. C. Hall) included the first organised meeting of members on the Continent. The visit to the neighbourhood of Boulogne was attended by twenty-one members and friends from Britain, who were joined by a number of French and Belgian botanists. We record our thanks to Professor P. Jovet for his great assistance in making this a most successful meeting. The attendance at other meetings was The Lizard 39, Wells 34, Carnforth 15, Portsmouth 14, Bala 12, Wisbech 31, Hertfordshire 37. The total attendance of 203 (120) was above that of recent years.

We reported last year that we had considered plans for the organisation of the work of the Society on a regional basis. It is now proposed to implement these plans, which necessitates some new Rules and the amendment of others. The opportunity has, therefore been taken to revise the Rules and to re-arrange them in an order which may be regarded as more logical. Much of the work of the **Development and Rules Committee** (Secretary, D. E. Allen) has been directed towards the re-drafting of the Rules and drawing up the schedules to accompany them. These now have the full agreement of the Council and we ask members to approve them. We believe that under the new Rules concerning the regional organisation a greater number of members will be enabled to play an effective part in our activities.

Threats to several sites of outstanding botanical interest became known to the **Conservation Committee** (Secretary, C. D. Pigott) during the year and action was taken, either by raising objection or negotiating in the Society's name, or by offering advice and assistance to the Nature Conservancy and Council for Nature. A formal objection to the proposal to extend the quarries on Berry Head near Brixham was made in the name of the Society and we were represented by Dr. M. C. F. Proctor who gave evidence on our behalf at a Public Inquiry. A decision is still awaited. During the summer the Minister of Power announced that in spite of objections he had given his consent to the construction of a nuclear power-station on Dungeness. The Committee felt bound to continue to press, though unsuccessfully, for the establishment of a Nature Reserve on part of the remaining area, as much of botanical interest will survive even though the primary physiographical value of the area will be destroyed. The scheme to develop Mochras in Merioneth as a caravan site was rejected at a Public Inquiry at which Dr. W. S. Lacey represented the Society. Unfortunately, this decision does not prevent temporary caravan parking in the dunes and this has continued and may well cause greater damage.

The Committee has continued to ask for action against the indiscriminate use of weed-killers and it is satisfactory to note that during the year concern has been expressed in Parliament; plans are now contemplated to establish a research unit to study the long-term effects of their use.

The year saw the end of the first phase of the Distribution Maps Scheme, the progress of which is the subject of a separate report by the Director. A statement of the accounts of the Scheme, which are kept separately from the Society's ordinary accounts, is similarly shown elsewhere. The **Maps Committee** (Secretary, Professor A. R. Clapham) has been chiefly occupied with working out the details of publication of the Atlas. At this stage we record our sincere appreciation to both the Nuffield Foundation and the Nature Conservancy for having financed the scheme during its first phase; whilst we also express our gratitude to the Nature Conservancy for taking the full financial burden of the second phase.

The **Junior Activities Committee** (Secretary, Margaret E. Bradshaw) again organised a full programme of meetings attended mainly by botanists still of school age. Two residential meetings were held, at Bangor and in the Peak District, and were attended by 13 and 18 young persons respectively. For the Bangor meeting Professor P. W. Richards kindly made facilities available at the Botany Department of the University and we are indebted to Dr. Martin, Warden of the Women's Hall of Residence, who attended admirably to the comforts of those who were present. The attendance at other field meetings was Amersham 22, Durham 33, Dawlish Warren 40, Reigate Heath 12, Dinas Powis 9, Saltburn 5, Wimbledon Common 50, Amberley 60, Freshfield Dunes 21. It is sad to reflect that in a summer of ideal weather no less than three meetings should have been badly affected by weather conditions. A visit to Chelsea Physic Garden had an attendance of 30. The total attendance at all meetings was 313 (268). The Fourth Annual Assembly of the International Youth Federation for the Study and Observation of Nature was held in Britain at Stockbridge, Hampshire, and our representative was again Miss E. Sadler.

It is reported earlier that the Annual General Meeting was held in Scotland. In addition other meetings in Scotland were organised by the **Committee for the Study of the Scottish flora** (Secretary, B. W. Ribbons), a joint committee with the Botanical Society of Edinburgh. In collaboration with the Perthshire Society of Natural Science an exhibition meeting was held at the Museum and Art Gallery, Perth (by kind permission of the Director) and was attended by 90 members and friends. A similar meeting was also held at the Royal Botanic Garden, Edinburgh (by kind permission of the Regius Keeper). There were also two field meetings at Castle Douglas, Kirkcudbright, and the Isles of Lewis and Harris, with attendances of 14 and 8. The latter meeting was organised to collect information from an unrecorded area for the Maps Scheme. A fuller account of the work of the Committee will appear in *Proceedings*, Vol. 4, Part 1.

The Council is conscious that this Report gives insufficient thanks to the many members and friends who, while seeking no recognition, have worked for the continued success of the Society.

T. G. TUTIN, President.
J. G. DONY, General Secretary.

By Order of the Council,
February 12th, 1960.

GENERAL INCOME AND EXPENDITURE ACCOUNT
for the year ended 31st December 1959.

	Cost of printing and distributing:		
	(i) *Proceedings*, Vol. III, Part 3	£370 16 6	
	Vol. III, Part 4 (provision)	350 0 0	
	(ii) *Watsonia*, Vol. IV, Part 4	405 5 9	
.2			1,126 2 3
50	Grant to Maps Scheme ...		50 0 0
20	Printing Notices of Meetings		113 14 10
75	Expenses of Council and Committee Meetings ...		78 8 3
71	General Printing, Stationery, Postages, Telephone and petty expenses ...		108 17 5
9	Field and Exhibition Meetings expenses, less fees received		3 5 1
-	Transfer to Publications Fund		750 0 0
-	Excess of income over expenditure credited to General Fund		29 2 6
37			£2,259 10 4

1958			
£1,470	Subscriptions received ...		£1,798 13 11
100	Interest received		102 16 1
	Proceeds from Sales:		
	Proceedings ...	£55 11 10	
	Watsonia ...	161 9 9	
	Old Reports ...	60 18 9	
158			278 0 4
	Grant from Ghana Government towards cost of *Proceedings*, Vol. III, Part 3		80 0 0
59	Excess of expenditure over income charged to General Fund (1958)		
£1,787			£2,259 10 4

PUBLICATIONS FUND

Transactions in 1959

3	Cost of printing and/or binding:	
	British Herbaria errata slip	£2 15 0
	Prospectuses and Publicity, less grants received ...	5 14 6
	Balance to 1960	1,787 8 7
		£1,795 18 1

1958		
£1,096	Balance from 1958	£684 14 5
—	Grant from Royal Society towards cost of *British Herbaria*	100 0 0
	Sales:	
74	*Flora of Jersey*	7 0 6
34	*British Herbaria*	23 15 8
74	*List of British Vascular Plants* (half share) ...	157 14 11
76	Conference Reports ...	58 5 2
2	Other Publications ...	14 7 5
—	Transfer from General Income and Expenditure Account	750 0 0
£1,356		£1,795 18 1

BALANCE SHEET as at 31st December 1959.

1958			1958			
	General Fund:			Investments:		
	Balance 1st January 1959	£995 16 10		4½% Defence Bonds ...	£500 0 0	
	Add: Legacy received from Estate of Miss E. M. Parsons Dec'd	45 14 4	£1,500	5% Defence Bonds ...	1,000 0 0	£1,500 0 0
	Excess of income over expenditure for the year	29 2 6		Cash at Bank: Deposit Account ...	£1,800 0 0	
£996		£1,070 13 8	750	Current Account ...	73 18 7	1,873 18 7
685	Publications Fund	1,787 8 7				
39	Benevolent Fund	39 11 0				
361	Creditors for Printing and General Expenses ...	369 7 6				
169	Subscriptions received in advance	106 17 10				
£2,250		£3,373 18 7	£2,250			£3,373 18 7

J. C. GARDINER, Hon. Treasurer.

Examined and found correct.
January 30th, 1960.

J. H. G. PETERKEN, Hon. Auditor.

DISTRIBUTION MAPS SCHEME

SIXTH ANNUAL REPORT TO 31st DECEMBER 1959

The main emphasis of the activities of the Maps Scheme during 1959 has been altered from that of collection of records to that of editing the data and the production of maps. Necessarily the former still continued and some very useful and essential field work was done to help fill the last few remaining gaps in the survey, notably in the Outer Hebrides and West Lancashire. Moreover, a start was made in collecting data specifically for the second or critical volume which is to follow a year or two after the first volume. The cover of the survey has been remarkably complete with only a dozen squares, mainly inaccessible, not visited at all, and about 100 with less than 150 records: some of them may not contain 150 different species in any case.

By the end of March, herbarium and literature research on the 350 or so selected rare species was complete and map production began at once. These were finished by the end of September, and since then attention has been turned to the species which occur in less than 100 vice-counties in the British Isles. Though research on these cannot be as thorough as for the rare species, literature is being searched for records for counties from which no field data have been received during the last 6 years. This is a fairly lengthy process but it is thought to be essential in many cases where human activity has probably so reduced the range that present distribution alone could only be misleading. Plans for the printing and publication of the Atlas are now well advanced.

In April the first five years of the scheme came to an end, and with that the resignation of Dr. Walters from his position as Director. I would like to record my sincerest thanks to him for his unceasing enthusiasm and gracious tact which helped us through and over innumerable difficulties. However, his loss is not so hard to bear as it might seem as his home address is—1 Brookside.

Another severe loss was the resignation of Miss Matthews, who accepted a higher post in the Botany School. The Society was pleased to acknowledge her efforts with a token of its gratitude. We are fortunate to be able to welcome in her place Miss J. Nicholson.

F. H. PERRING.

DISTRIBUTION ATLAS ACCOUNT

For the Year Ended 31st December 1959.

1958			
	To Balance from 1958:		
	Current Account	£2 8 11	
	Deposit Account	500 0 0	
£502			£502 8 11
—	,, Repayment of Defence Bonds		500 0 0
2,178	,, Grant from Nature Conservancy		2,805 0 0
50	,, Grant from B.S.B.I. ...		50 0 0
2,050	,, Grant from Nuffield Foundation (1958) ...		—
40	,, Interest received		26 17 6
12	,, Sales of record cards ...		6 0 8
—	,, Copyright Fee		75 0 0
£4,832			£3,965 7 1

1958			
£73	By Furniture and Office Equipment		£58 2 7
	,, Mechanisation Equipment:		
	Rental Charges and Maintenance	£532 1 0	
	Stationery	42 12 7	
683			574 13 7
87	,, Postage and Telephones		63 13 10
288	,, Printing and Stationery		86 0 6
137	,, Rent, Rates, Heating and Lighting		58 3 2
2,626	,, Salaries, Wages and clerical assistance ...		2,150 8 8
	,, Travelling Expenses:		
	Staff ...	£73 18 11	
	Others ...	12 0 0	
417			85 18 11
12	,, Insurance		9 4 8
5	,, Repairs		2 17 6
2	,, Other expenses		6 13 10
	,, Balance to 1960 (being total funds in hand):		
	Current A/c.	£369 9 10	
	Deposit A/c.	500 0 0	
			869 9 10
£4,832			£3,965 7 1

J. C. GARDINER, Hon. Treasurer

Examined and found correct.
January 30th, 1960.

J. H. G. PETERKEN, Hon. Auditor

COMMITTEE FOR THE STUDY OF THE SCOTTISH FLORA

FIFTH ANNUAL REPORT TO 31st DECEMBER 1959

The Committee has met thrice (at Perth in March and October and at Edinburgh in November) and, in addition, met the officers of the two sponsoring societies at Edinburgh in April. Two Exhibition Meetings were held: at the Museum and Art Gallery, Perth, by kind permission of the Director, on 21 March and at the Royal Botanic Garden, Edinburgh, by kind permission of the Regius Keeper, on 7 November. There were also two Field Meetings: at Castle Douglas, 12-15 June, led by Miss E. I. Biggar, and on the Isles of Lewis and Harris, 1-15 August, led by Dr. F. H. Perring and Miss U. K. Duncan respectively. The Committee also made the arrangements for the Annual General Meeting of the B.S.B.I. in April.

Much of the work at the Field Meetings was again devoted to the Distribution Maps Scheme; 14 members and friends attended at Castle Douglas, 9 at Lewis and 9 at Harris. Reports of these meetings will appear in the *Proceedings of the B.S.B.I.*, Vol. 4, part 2.

The Exhibition Meeting in Perth was attended by about 60 persons. Professor J. R. Matthews delivered an illustrated lecture: "The Perthshire flora: An Analysis" and, after discussion, he was thanked by Dr. Langlands, President of the Perthshire Society of Natural Science. The B.S.B.I. and B.S.E. official exhibits were displayed together with the following: Woodland bryophytes from the Den o' Alyth (Dr. and Mrs. D. A. Robertson, Dundee); Living plants—*Lemna trisulca*, an example of rapid colonisation growing on primary settlement tank of sewage works at Scone; *Petasites japonicus*, *P. fragrans* and *P. albus* all introduced and established in a number of places (members of the botany section of the P.S.N.S.); *Hapalosphaeria deformans*—a fungus which causes malformation of *Rubus* spp., first recorded in Britain in 1907 and now again in 1947 (Dr. Mary Noble, Edinburgh); *Leontodon autumnalis*, a comparison of the varieties *pratensis* (Link) Koch., *sordidus* Bab. and *simplex* Duby (D. Ratcliffe and R. Knox, Edinburgh); Scottish Carices (Miss U. K. Duncan, Arbroath); Plant and soil succession on the Serpentine of Meikle Kilrannoch, Glen Clova, Angus (John K. Marshall, St. Andrews); Studies in serpentine soil infertility using serpentine soil from Unst, Shetland (Miss E. Millar, St. Andrews); Plants alien to Britain but naturalised and in many cases spreading (P. S. Green, Edinburgh). The Chairman of the Committee thanked the Director of the Museum and the members of the Perthshire Society of Natural Science, with whose co-operation the meeting had been held. Mr. A. W. Robson and the members responsible for preparing and donating the wonderful tea were especially thanked.

In Edinburgh the attendance was about 90 and the Chairman presided at the meeting. Miss E. P. Beattie showed a series of coloured slides of plants of the Edinburgh area, accompanied by a racy commentary. Mr. D. McCosh also showed some slides of Scottish plants. Earlier in the afternoon the following exhibits were shown: Hybridisation in the British species of *Papaver* (I. McNaughton); Variation in the British birches (F. J. W. England); Ecological distribution of two races in local *Festuca ovina* and a parallel in *Agrostis* species (Patricia J. Watson and D. J. Harberd); Clone-spotting in *Trifolium repens* (D. J. Harberd); Crop diseases and wild plants (Mary Noble and J. M. Todd); Some interesting Scottish aliens (Elizabeth Beattie); Variation in *Leontodon autumnalis* (R. B. Knox); British plants said to occur in Pakistan (B. L. Burtt); Herbarium antiquities (I. C. Hedge); Some interesting plants from the Glass Department (Royal Botanic Garden); and also the exhibits of the two societies. Mr. D. M. Henderson kindly acted as local organiser for this meeting.

At the Annual General Meeting of the B.S.B.I. in Edinburgh on 11 April the Regius Keeper of the Royal Botanic Garden and also the Council of the B.S.E. kindly afforded the Committee many facilities; arrangements were made for lectures to be given by Professor J. R. Matthews and Mr. J. Anthony, and for conducted tours of the Garden. A Report of this meeting appeared in the *Proceedings of the B.S.B.I.*, Vol. 3, pp. 350-353, 1959.

In April the B.S.B.I. appointed Dr. N. M. Pritchard as a member of the Committee in place of Dr. G. Taylor, and in November, when Professor Matthews resigned, the B.S.E. appointed Mr. P. S. Green to fill the vacancy. Professor Matthews has been closely associated with the Committee since the time of the first meeting in Edinburgh on 9 May 1955, and the Committee is very sensible of the debt it owes to this distinguished student of the Scottish flora and much regrets that the formal connexion is now severed.

Mr. R. Mackechnie was reappointed Chairman and Mrs. F. M. Elder, Field Secretary. It has not been possible to find a Meetings Secretary but Messrs. D. M. Henderson and J. Grant Roger have kindly agreed to share this work for the time being.

The accounts showed a deficit of £13 13s 2d for the year 1958 and this amount has been refunded by the two societies. It should be noted that the average cost of the Committee to each of the two societies for the four years 1955-1958 has been £2 per annum (plus the cost of printing the Annual Programme). The deficit of 1958 is accounted for by the reduction in the number of field meetings (and hence fewer booking fees received) together with an increase in the number of Exhibition Meetings held.

The Committee adheres to its conviction that educational work, which cannot be accomplished without the spending of money, is one of its most important tasks and that in this way new members will be found for both societies.

During the year the Committee agreed to accept, in due course, responsibility for housing a set of Scottish Master Cards for the Distribution Maps Scheme. Through the courtesy of the B.S.B.I. the Committee was able to examine and comment in detail upon the proposals for revised rules of that society.

The Committee is deeply indebted to individuals mentioned in the course of this Report, to the officers of the two societies and also to others too numerous to list separately. Grateful thanks are expressed to everyone who has helped in any way during the year.

B. W. RIBBONS.

SUMMARY OF PAPERS READ PRIOR TO THE ANNUAL GENERAL MEETING, 1960

THE VEGETATION AND FLORA OF THE WEALD

FRANCIS ROSE

In a wide geological sense, the Weald includes those parts of Kent, Surrey and Sussex bounded by the rim of the chalk downs, or, in the more restricted sense, those bounded by the Greensand hills; an elongated dome, the highest parts having been eroded to expose the oldest rocks in the centre. The "Low Weald" is clay; the "High Weald", Hastings Beds, including Tunbridge Wells Sand, Wadhurst Clay and Ashdown Sand. This varied geology has given rise to a diversified surface and varied soil types, habitats and scenery. Viewed from one of the surrounding heights, the Weald still appears to be almost continuous forest, due to the many hedgerow trees; it has a deceptive appearance of richness, for basically the soil is either too heavy on the clays or too light and mineral-deficient on the sands. For this reason it was left undisturbed by the early farmers.

In the "Atlantic Period", about 4,000 to 6,000 years ago, the Weald was covered by oakwood mixed with alder, elm and lime. Wych elm is still present on the sides of some ghylls (ravines) where it is not likely to have been planted. Service trees occur and are often taken to indicate native forest. Beech arrived only late in Neolithic times and persists on well-drained soils.

The Romans called the forest "Silva Anderida" and drove Stane Street through it, but otherwise developed it little. The Saxon name was "Andreaswald" and the Weald obviously derives its name from the German word for a forest. A map of settlements of the Domesday period shows them to have been very sparse in the Weald. Many of the villages in both the Low and the High Weald date from mediæval times when iron-working made it an industrial area from the 15th to the mid-17th centuries. During that period almost all the primitive forest cover was cleared for charcoal and ship- and house-building. Names such as Hammer Pond, Furnace Wood and Forge Farm are still frequent. Many areas were allowed to regenerate naturally. Some became coppice-with-standards, but much oak woodland is now being planted with conifers. It is earnestly to be hoped that Conservation of some of the old woodlands can be undertaken in East Sussex.

A climate map for south-east England shows that the highest rainfall, apart from the western South Downs, occurs in the High Weald (from 30 ins. up to over 35 ins. a year). Varied geology, dissected topography, high rainfall giving moist atmosphere, and abundance of woodland are four important reasons for the varied flora.

There is a very interesting group of "Atlantic" species, reaching, in the 'High Weald' country of south-west Kent and central Sussex, their eastern limit of distribution in Britain, in the moist sheltered habitats on the massive sandstones and in the deep wooded ghylls: *Hymenophyllum tunbrigense*, a relic of the 'Atlantic Period', in twelve localities, the evergreen *Dryopteris aemula*, known in 60 localities in the Weald and *Sibthorpia europaea*; *Wahlenbergia hederacea* in heathy woodland rides, and *Carex binervis*.

The 'northern montane' element is represented by *Lycopodium clavatum*, *Equisetum sylvaticum* and *Thelypteris limbosperma* (*oreopteris*). The wet springy alder woods of the High Weald ghylls are rich in moisture-loving species, but in general the base-poor water excludes many species, and though *Chrysosplenium oppositifolium* is abundant, *C. alternifolium* does not occur now; *Carex strigosa* is frequent on the Wadhurst Clay, *C. laevigata* and *Thelypteris phegopteris* on the sands. It is from the Bargate Stone in the western Weald, and from the Ragstone of the Hythe Beds of the Lower Greensand in Kent, that calcareous, base-rich water reaches the alder carrs where both *Chrysosplenium oppositifolium* and *C. alternifolium* flourish with *Caltha palustris, Cardamine amara* and *Allium ursinum*. *Cardamine bulbifera* and the much more local *Phyteuma spicatum* have peculiar distributions probably depending on historical rather than on ecological factors. *Carex vulpina* is virtually restricted to the Weald Clay.

The heathlands of the Weald are interesting and unusual. Ashdown Forest is Common Land; twenty square miles of open heath, from which the forest was probably cleared in mediæval times. Soil studies by D. Streeter show the absence of any podsol pan. *Osmunda* is a woodland relic here. *Ulex minor* has increased, but *Genista pilosa* has dwindled recently, probably in both cases owing to frequent heath fires caused by roadside picnickers, but *Gentiana pneumonanthe* is still abundant, often associated with *Molinia caerulea* and *Serratula tinctoria*. *Lycopodium inundatum* is still in at least three places, but *Eriophorum vaginatum* is apparently extinct.

The lecture was illustrated by slides, colour photographs and distribution maps.

THE IDENTIFICATION OF CONIFERS

J. E. S. Souster

(Assistant Curator, Royal Botanic Gardens, Kew)

Though we have only three native species of Conifers, at least 125 exotic species have been grown in the open in the British Isles, and these can present many problems of identification. Though recognition must be mainly visual, smell, taste and even feel can sometimes help. The field botanist has an advantage over the herbarium worker as he can make use of habit and bark characters. Habit may alone distinguish a species with considerable certainty. Bark characters are easier to recognise than to put into words, and are used much more by foresters than by botanists.

The young shoots provide some of the best characters for recognition, and some of these were mentioned and illustrated with diagrams, e.g. dwarf shoots as found in *Larix*, etc., and the leaf-insertion in *Abies* with its flush, circular leaf-scars, in *Picea* with its persistent peg-like, decurrent leaf-bases, and in *Pinus* with its bundles of usually 2, 3, or 5 leaves with a scaly basal sheath. The transverse sections of needle leaves vary greatly, and a useful distinction can be made in *Picea* on this character. The "double needles" of the Japanese Umbrella Pine, *Sciadopitys verticillata*, are unmistakable. Scale-like, awl-like and flat leaves are also found in Conifers, the flat leaves of some *Agathis* spp. attaining 7 inches in length. *Phyllocladus* has reduced true leaves and flattened branch systems which function as leaves.

Cones provide many distinguishing features, but those which most interest taxonomists are not necessarily the most useful in field identification. Such obvious characters as size, colour, shape, attitude, duration on the tree and method of opening to shed the seeds should all be observed, and particular types of cone may characterise whole genera. A selection of cone characters was illustrated with diagrams.

To conclude, about 25 genera of the more commonly planted Conifers were keyed out, on a series of lantern slides, making use of the characters previously discussed but with emphasis on vegetative features.

ANNUAL GENERAL MEETING, 9th APRIL 1960

The Annual General Meeting of members of the Society was held in the Rooms of the Linnean Society of London, Burlington House, Piccadilly, London, W.1, on Saturday, 9th April 1960, at 12.15 p.m.

The President (Professor T. G. Tutin) was in the Chair and seventy members were present.

The Minutes of the last Annual General Meeting, as printed in *Proceedings*, Vol. 3, Part 3, pages 352-353, were adopted.

COUNCIL'S REPORT. The Report of the Council for the year 1959, which had been printed and circulated to all members, was adopted unanimously.

ELECTION OF VICE-PRESIDENTS. Council had nominated E. Milne-Redhead for re-election and Miss C. M. Rob and Dr. E. F. Warburg for election, and on a show of hands they were duly elected.

ELECTION OF HONORARY SECRETARY AND HONORARY TREASURER. Council had nominated Dr. J. G. Dony and J. C. Gardiner respectively and they were elected unanimously with acclamation and thanks for their past services.

ELECTION OF HONORARY EDITORS. Council had nominated D. H. Kent for re-election and Dr. M. C. F. Proctor and they were elected unanimously with thanks to Mr. Kent and to the retiring Editor, Dr. Warburg, for his 12 years' service.

ELECTION OF HONORARY MEETINGS SECRETARY, HONORARY FIELD SECRETARY AND HONORARY JUNIOR ACTIVITIES SECRETARY. Council had nominated Dr. H. J. M. Bowen, P. C. Hall and Dr. Margaret E. Bradshaw respectively and they were elected unanimously.

ELECTION OF MEMBERS OF COUNCIL. There were four vacancies caused by the retirement, under Rule 3(e), of J. Grant Roger, Miss C. M. Rob, A. W. Westrup and Dr. S. M. Walters, and two vacancies caused by the resignation of Prof. D. A. Webb from the Council and the election of P. C. Hall as Honorary Field Secretary. Ten members had been nominated under Rule 3(f). Ballot papers were provided, and D. E. Allen and Dr. Margaret E. Bradshaw were appointed scrutineers, and C. C. Townsend, Dr. F. Rose, Dr. A. Melderis, J. E. Lousley, R. S. R. Fitter and Miss M. McCallum Webster were elected. The order of seniority for retirement, as decided by lots drawn by the Chairman, is in the sequence given.

ELECTION OF TWO HONORARY MEMBERS. Council had nominated Professor W. H. Camp for his services at the Darwinian Centenary

Conference, and Dr. E. F. Warburg in recognition of his editorship of *Watsonia* from 1949 to 1960, and they were elected unanimously.

REVISION OF RULES. Revised Rules recommended by Council, had been printed and circulated to all members. The President indicated that the major alteration was a partial decentralisation and direct representation of the Regions on Council. The new Rules were adopted unanimously.

There being no further business, the President thanked members for their attendance and declared the Meeting closed at 12.45 p.m.

J. G. D.
B. W.

On Sunday, April 10th, a party of about 25 visited the National Pinetum at Bedgebury near Goudhurst, Kent, accompanied by Mr. J. E. S. Souster and Dr. R. Melville. The first hour of a fine, windy day was spent among natural vegetation in a ghyll, and after lunch a brief tour of the experimental forest plots was made and *Lycopodium clavatum* seen.

Then Mr. A. Westall, the Forester in Charge of Bedgebury, and our member, Mr. W. J. Davies, also of the Forestry Commission, showed the party (with infectious enthusiasm) representatives of the various genera, including beautiful tall columnar specimen trees and little flat-topped ones, and pointed out those which regenerate, and the most useful recognition characters of each.

On the return journey a detour was made to look at *Cardamine bulbifera* which was almost in bloom.

ASSISTANT SECRETARY'S REPORT FOR 1959

During 1959, 110 new members joined the Society, this being 15 more than in 1958, and 99 less than in 1957. Of the new members 70 were Ordinary members, 16 Subscriber members, 17 Junior members and 7 Family members.

Losses were 158, this being 31 more than in 1958, and 91 more than in 1957. Of these, 68 members resigned, 76 ceased to be members under the operation of Rule 6 (e), and we deeply regret having to record the deaths of the following 14 members:—Frère Louis-Arsène, G. M. Ash, Dr. R. C. L. Burges, F. David, G. Dent, Rev. A. F. Fountain, J. R. Lee, Dr. W. H. Mills, E. Nelmes, Miss L. M. Parsons, Dr. D. Patton, Mrs. S. E. Taylor, E. H. White and D. N. Williams.

New Ordinary members are:—M. C. Appleby, J. E. Aslett, R. A. Bacon, W. G. H. Bailey, Dr. D. Bakker, Miss E. R. Ballard, Hon. Mrs. A. O. Baring (rejoined), Lady Barlow, C. P. Barrett, R. D. Beauchamp, Mrs. A. Booth (rejoined), D. Brightmore, H. Britten (rejoined), Mrs. E. D. Brown, J. M. Brummitt, P. D. Hutley-Bull, A. A. Bullock, S. C. Clark, C. D. Cook, Dr. J. L. Crosby, Miss M. Daulman, M. Essex, P. Evans, Mrs. D. A. Frazer, Mrs. J. E. Gaffney, P. R. Gatehouse, Dr. M. George, C. J. Grant, Miss I. F. Gravestock, Miss H. J. Griffiths, Mrs. D. Hackney, A. D. Hallam, E. B. Harris, G. E. C. Hemingway, P. H. Holway, Miss A. M. Hutchison, E. G. Ing, J. K. Jackson, D. E. James, A. G. Jones, Mrs. M. D. G. Jones, Rev. D. Kingston, L. J. Larsen, Rev. T. Maloney, Prof. I. Manton (rejoined), Miss K. M. Marks, Miss A. B. Mowat, J. Newbould, Mrs. F. M. Parish, Dr. A. Patzak, Rev. A. L. Primavesi, Mrs. M. E. Reis, J. Rhodes, Miss V. J. Ricketts, Dr. A. J. Rook (rejoined), Dr. A. Schumacher, Mrs. M. M. Seabroke, M. R. D. Seaward, J. Skeel, G. R. Sloman, H. C. P. Smail, Mrs. M. L. Sprague, J. Timson, W. H. Tucker, C. R. Vardy, R. C. Walls, J. A. Ward, J. C. G. Wegerif, M. G. Young, and Mrs. J. S. Yule.

New Junior Members are:—K. J. Adams, Miss N. Armstrong, M. Beeson, Miss S. Bridgwater, Miss H. M. Brighouse, B. R. Bristow, G. F. Campbell, C. D. A. Cochran, D. Harding, N. Jardine, Miss S. McNaughton, G. F. Peterken, Miss H. M. Ross, T. Cavalier-Smith, Miss J. M. Tunstall, C. Turner, and Miss J. S. Webster.

New Subscriber Members are:—Newton Park College, Bath; Bristol Naturalists' Society; Chatham General Library; Instituto Botânico da Universidade, Coimbra; Harrow Weald Grammar School; Nutritional Research Unit, Huntingdon; Eltham Hill School, London; Parliament Hill School, London; Scottish Marine Biological Station, Millport; Institut for Systematische Botanik der Universität, München; Northallerton Grammar School; Penarth Grammar School; Ackworth School Natural History Society, Pontefract; Základni knihovna Československá akademie, Prague; Warwick Natural History Society, and Institut für Spezielle Botanik, Zürich.

New Family Members are:—Mrs. W. G. H. Bailey, Mrs. D. Brightmore, E. K. Brown, Mrs. O. M. Hallam, Miss A. Hodgson, Miss A. Reis and Mrs. I. N. Skeel.

January 1960. D. H. Kent.

OBITUARIES

Richard Charles L'Estrange Burges (1901-1959).—The death of Dr. R. C. L. Burges on 31st July 1959 has deprived the Society of a Vice-President who was one of its most respected and popular supporters. He became a member in 1931, was co-opted to the Council in 1941, and elected for further periods of service in 1947 and 1951. At our last Annual General Meeting, on 11th April 1959, he was elected Vice-President.

Burges was the eldest son of Dr. F. A. L'E. Burges and was educated at King Edward's School, Birmingham, and Caius College, Cambridge. Joining his father's practice, he lived the exacting life of a general practitioner in an industrial town, and for many years his leisure was limited to such brief and uncertain intervals as he could snatch from his medical duties. A keen athlete, he played cricket for his school, rugby football for his college and the North Midlands, and excelled at tennis which he played for Warwickshire County and Edgbaston Lawn Tennis Club—of the latter he was chairman for 5 years.

From his mother and an aunt (Miss Agatha Wilkinson) he acquired an early interest in wild flowers, but it was not until he was 30 that time could be found for a serious interest in botany. When he did take it up his enthusiasm and knowledge developed rapidly, and it was during this period that he carried out his more strenuous field work. I joined him on trips to Scotland and Ireland where we crowded as much into a fortnight as was humanly possible, and for other holidays. Occasionally he was able to be free for a few hours between surgeries and this was devoted to field work in the country in the vicinity of Birmingham, where he gradually built up an outstanding knowledge of the flora. Burton-on-Trent was within easy reach and Burges made frequent visits to study the brewery aliens which were so plentiful there until about 1943. This work culminated in his paper on the "Adventive Flora of Burton-on-Trent" (*Rep. Bot. Soc. & E.C.*, **12**, 815-819, 1946).

At the outbreak of war Burges offered his services to the War Office and was posted to Salisbury Plain to take charge of a hospital which was still to be built. For a short time he was able to indulge his hobby and he used his leisure to make a useful contribution to knowledge of the Wiltshire flora ("The Larkhill flora", *Wilts. Arch. & Nat. Hist. Mag.*, **50**, 188, 1943, and contributions to J. D. Grose's annual "Notes" for 1940-1943 in the same periodical). He was one of the few botanists able to visit the field of wool aliens at Portchester, Hants, found by P. M. Hall in August 1939. Before the end of the war Burges returned to his practice at Birmingham. Deeply interested in industrial medicine as well as clinical work, he accepted numerous medical appointments. His high standing in his profession is indicated by his election as Chairman of the Birmingham division of the British Medical Association for 1956-57. A major operation in 1958 enforced a less active life but by the summer of 1959 he seemed to be well on the road to recovery. With a sudden relapse, the end came after only a week in hospital.

Dick Burges would never regard himself as a serious worker in botany but his influence on the progress of British botany over the last 20 years has been considerable. He had a genius for saying the right thing, to the right people, at the right time, so that others were prompted to take much needed actions. This was at its best at times when discussion tended to get bogged down in elaborate theories and had strayed from the fundamental point at issue. On such occasions Burges would intervene with practical arguments put in such a quiet and jocular way that it was impossible to take offence, and, even if his contentions were not always accepted, they were commonly the basis for a sound decision. For plants he had a good eye, and he was very persistent in drawing attention to those which he thought deserved further study. He was directing interest to the *Alisma* at Westwood Pool for nearly 10 years before it was recognised as *A. gramineum*, and his persistence over this, and other plants, was fully justified in the end.

Burges' herbarium techniques were very much his own. In order to preserve colour he dried his specimens between sheets of gamgee in a wire frame, and with the use of considerable heat. The method had advantages and especially on holiday, when large numbers of specimens could be dried without fear of mould in a press of a fraction of the size and weight of one of conventional type. The disadvantages included the covering of specimens with threads of cotton wool and their failure to be pressed flat. The method was not new but Burges was almost the only botanist using it until he introduced it to others. The resulting specimens were mounted on small sheets and stored in loose-leaf files which he continued to buy from the Cambridge stationers he patronized in his student days. For easy reference and taking up the minimum space an unconventional herbarium of this kind appealed to its owner's individuality. It is a valuable collection rich in Midland plants and Burton-on-Trent aliens.

Burges took a keen interest in local natural history and will long be remembered in Birmingham (and elsewhere) for the help he gave so freely and so patiently to beginners. He was an active member of Birmingham Natural History and Philosophical Society for many years and when the Botanical Section was formed in 1947 he was its first President, a post he held for the next 4 years. He was President of the Society for 1955 and 1956 and to this Society he bequeathed his herbarium and botanical books. He was a Fellow of the Linnean Society to which he was elected in 1939. To his many friends his death is a sad personal loss, and his presence at meetings of our own Society will be greatly missed.

J. E. LOUSLEY.

JOHN RAMSAY LEE (1868-1959) was born in Helensburgh, Dunbartonshire, on 26th May 1868. The family moved to the north of England when he was four years old, but by 1885 had returned to Scotland, and from then onward Lee's home was in Glasgow. In 1899 he married Isabella Macbride Stirling, who died in 1937; there was no family.

Until his retirement in 1930 he was employed as cashier to a firm of city warehousemen; thereafter his life was divided between his botanical activities and his religion, for he was a serious churchman, and for over 50 years an elder of Greyfriars Church. He died in a Glasgow hospital on 14th January 1959, in his ninety-first year.

It is on record that Lee's interest in plants was aroused while he was a pupil in an English school, as a result of lessons from one, Mr. Dawkins, a country schoolmaster. In the spring of 1885 he attended a Popular Botany class in Anderson's College, Glasgow, and in the autumn of that year sixteen members of the class met to launch the Andersonian Naturalists' Society. Twenty years earlier Roger Hennedy, then occupant of the Botany chair in this same "Anderson's University", had produced the first of several editions of his famous *Clydesdale Flora*; it is unlikely that any of Lee's classmates of 1885 saw in the youth of seventeen Hennedy's successor as a field-botanist. But by 1903 he had so impressed his fellow-members that they elected him President of the Society, and from 1911 to 1914 he held the same office in the older Glasgow Natural History Society. When, in 1931, these two bodies and the Microscopical Society of Glasgow amalgamated, Lee was the obvious choice for first President of the new Society (now the Andersonian Naturalists of Glasgow), and he held office until 1933. In that year his *Flora of the Clyde Area* appeared—the first publication of its kind since the fifth edition of Hennedy's *Clydesdale Flora* in 1891. In 1938 he became Honorary Curator of the Herbarium of Glasgow University, which now contains his own private collection, and in 1950 the University conferred on him the rare distinction of honorary Master of Arts. In 1956, at the age of eighty-eight, he led his last excursion, to Stirling Castle; from that time, while a regular attender at Society meetings, he appeared less often in the field.

Of Lee's field activities much could be written, but here an outline must suffice. Most of his botanising was in the Clyde valley, which he knew intimately, and in the Perthshire hills. In 1936, when he was sixty-eight, he visited Iceland, and had great pleasure in the experience. During his later years he frequently spent part of June at Ashford in Kent. When the physical effort of climbing to the rocks where his beloved "alpines" grew became too great for him, he turned enthusiastically to the critical genera *Rubus* and *Rosa*, until in the end failing eyesight made even this activity impossible. During sixty years of active botanising he met and corresponded with many of the leading field-botanists of the time; in addition to his work with flowering plants and ferns he became a bryologist of national reputation. His membership of this Society extended over thirty-five years, and to its publications he contributed many records. Most of his published papers appeared in the *Glasgow Naturalist* (a full bibliography is in vol. **18**, 113) over the period 1896 to 1955. He attended British Association meetings whenever he could; for the Glasgow meetings of 1901 and 1927 he was heavily involved in the preparation of the "Handbook" and the "Clyde Card Catalogue" respectively. To his many friends, as it must have been to himself, it was a great pleasure that he was able to attend the Glasgow meeting of September 1958.

By nature Lee was a mild and patient man; he could not be either brusque or peremptory, and he gave the same careful consideration to the ingenuous question as to the profound. Slick answers, guessed identifications and playing to the gallery were alike foreign to his nature; his manner, his speech and even his dress were refreshing reminders of that more disciplined and less fevered generation to which he belonged. Successive generations of "Andersonians" owe more to the guidance and inspiration of John R. Lee than can readily be assessed, and those of us whose good fortune it was to know him well are the better, both as naturalists and as persons, for the experience.

R. MACKECHNIE.

ERNEST WILLIAM SWANTON, O.B.E. (1870-1958), an Honorary Member, who first joined the Society in 1920, died at Twickenham on 21st October 1958 at the age of eighty-eight.

Born on 28th June 1870 at Dibden, Somerset, he came of yeoman stock, and it was in the Somerset countryside, in which he spent his youth, that his love and knowledge of natural history were first aroused. For a few years after leaving school he was a schoolmaster and private tutor, but in 1897, hearing that Jonathan Hutchinson (1828-1913) was needing a curator at the Educational Museum he had established in Haslemere a few years earlier, he applied for the post and was accepted. Swanton gave himself with enthusiasm to the work and implemented many of Hutchinson's original ideas on the function and arrangement of museums as instruments of education. One of these concerned the display of living material and the Museum was probably the first in Britain to have a permanent display of wild flowers, a tradition which is continued to this day. He remained for the rest of his working life at the Museum, retiring only in 1948 at the age of 78. In 1936 his work was recognised by his appointment as M.B.E. and when he retired he was advanced to O.B.E. In 1949 he was granted a Civil List pension.

Swanton was one of the old school of naturalist-antiquaries and his interests and writings ranged widely over many subjects. Nevertheless, it is as a botanist that he will be remembered chiefly by his friends and the countless children in whom he first aroused an interest in and love of wild flowers. He was elected an Associate (*honoris causa*) of the Linnean Society in 1920. In 1898 he had been a founder-member of the British Mycological Society and was its President in 1916. Many notable forays of the Society were held in the Haslemere district with Mr. and Mrs. Swanton acting as genial hosts at the Museum. During the 1939-45 war Swanton, in collaboration with the late A. A. Pearson, assisted Dr. W. H. Wilkins at Oxford in an investigation of the antibiotics produced by the larger fungi, sending 1,374 isolations from 816 species of fungi collected in the Haslemere area.

Swanton's publications on botanical subjects include *Annotated Catalogue of Edible British Fungi* (1900) illustrated by six hand-coloured plates by the author; *Fungi and How to Know Them* (1909, a second edition appearing in 1922); *British Plant Galls* (1912) and *The Yew Trees of England*, published privately a few months before he died.—JOHN CLEGG.

GERALD MORTIMER ASH, F.L.S. (1900-1959).—The sudden death of Gerald Ash occurred on 5th September 1959, a few hours after he had collapsed in a Guildford street. His unexpectedly early death has robbed us of a man who was a most gifted amateur field botanist and one whose friendly manner made him so popular. Gerald Ash was born in London and was educated at St. Paul's School and Wye Agricultural College. After the First World War he came to live in S.W. Surrey where for many years he farmed at Lower Birtley, near Haslemere. As a busy farmer he nevertheless found time to botanize a good deal but it is significant that the majority of his best finds and localities were in the vicinity of his own farm.

It was quite near Lower Birtley that Ash discovered *Epilobium adenocaulon* Hausskn. in 1931, and although this N. American species had been gathered in Britain previously it was Ash, in collaboration with N. Y. Sandwith, who established the correct identity of the plant which has since spread in such a spectacular manner. This discovery was the subject of a paper by Ash and Sandwith in the *Journal of Botany* in 1935. At the B.S.B.I. Conference of 1952 on The Changing Flora of Britain Gerald Ash contributed an interesting exhibit on the status and spread of *E. adenocaulon* which included specimens of hybrids with other British willowherbs.

Although he was a specialist on willowherbs Ash was also keenly interested in many other genera and orders including *Carex* and the *Gramineae*; in fact, he had a wide knowledge of the British flora generally. He led frequent botanical excursions for the Haslemere Natural History Society and was always able to help both the merest beginners as well as more advanced field botanists. It was always his proud boast that he received his first help and encouragement in botany from the late Lady Davy.

Gerald Ash joined the B.S.B.I. in 1929 and served on the Council from 1950 to 1954; from 1955 to 1958 he was a Vice-President. He was President of the Haslemere Natural History Society from 1948-1951, and Chairman of the Haslemere Educational Museum from 1952 until his death. In Haslemere he was well known for his generous support of many clubs and societies. Through the generosity of his widow, the Haslemere Museum now has much of his herbarium material as well as the herbarium of the late Josiah Denyer of Eashing which Ash acquired from that well-known Surrey botanist. Ash's own herbarium of *Epilobium* is, however, deposited at the British Museum (Nat. Hist.).

We shall remember Gerald Ash as a thoroughly likeable and approachable man whose easy manner perhaps tended to hide the full range of his wide knowledge from all except those of us who were privileged to know him more closely.—A. L. JEWELL.

In the clay pits of the Brick Works at Brook, Gerald Ash had a natural willow-herb 'garden'. Here he would take his unsuspecting botanical friends. He would push his way through the scrub and along the rough rides and introduce to them, one by one, the common species of willow-herb: *Epilobium montanum, E. lanceolatum, E. obscurum, E. adenocaulon* (his own particular pet which he discovered as a widespread alien species in Britain) and *E. lamyi*. But soon he could not resist the temptation to thrust into one's hand something different, and with a twinkle in his eye he would ask innocently what species it was. The ordinary 'county flora' botanist would look at the stigmas and leaves and hazard a guess. In a trice he would enter into a fascinating and quite breath-taking demonstration of the hybrid willow-herbs, leaving the tyro bewildered. 'That', he would say 'is a hybrid. Look at its flushed petals, and I expect you will find that it has crisped hairs and perhaps a few glandular ones on the sepals—obviously some *E. adenocaulon* parentage here!'

From such a memorable day with Gerald Ash, I have in my collection *E. adenocaulon* × *parviflorum*, *E. adenocaulon* × *obscurum*, *E. adenocaulon* × *montanum* and *E. montanum* × *obscurum*, from the Brook Brick works. Now that the Brick Works are no longer in use and the land is for sale, there is every likelihood that the Willow-herb 'garden' will soon be overgrown, and that will be the end of what is almost a 'locus classicus'.—O. POLUNIN.

PERSONALIA AND NOTICES TO MEMBERS

ISOETES

Mr. A. C. Jermy, Department of Botany, British Museum (Natural History), Cromwell Road, London, S.W.7, is studying the ecology and distribution of *Isoetes* species in the British Isles and would welcome living material together with habitat notes, at any season and from any locality. Material would be best sent in a sealed plastic bag in a cardboard carton to prevent crushing. Postage will be refunded.

CREPIS

Mr. J. B. Marshall, Department of Botany, British Museum (Natural History), Cromwell Road, London, S.W.7, is studying the distribution of the British species of *Crepis*. Much confusion and misidentification has occurred in the past, and fresh material, herbarium specimens (on loan for short period) and records would be welcome. Material is particularly requested from the Midlands, northern England, Scotland and Ireland.

BUDDLEJA DAVIDII Franch.

Mr. D. H. Kent, 75 Adelaide Road, London, W.13, is interested in the historical spread of *Buddleja davidii* in the British Isles and would be grateful for records. Especially requested are details of habitats and length of time that the species has been known to occur in them.

AGROPYRON JUNCEIFORME (A. & D. Löve) A. & D. Löve

Mr. Hans Runemark, Institute of Systematic Botany of the University of Lund, Botanical Garden and Botanical Museum, Lund, Sweden, is working on a taxonomic revision of *Agropyron junceiforme* and related species and would be grateful for samples of seed from southern England.

CALAMAGROSTIS

Miss K. E. Luck, The Botany School, University of Cambridge, is working on the autecology of *Calamagrostis epigejos* (L.) Roth and *C. canescens* (Weber) Roth in Britain. She would be pleased to receive material (seeds, or preferably vegetative or flowering plants) from any part of the British Isles; detailed information with, or without material, about habitats would be appreciated. Postage will be refunded.

FLORA OF MORAY AND NAIRN

Miss M. McCallum Webster, c/o The Herbarium, Royal Botanical Gardens, Kew, Richmond, Surrey, is compiling a Flora of Moray and Nairn and would be grateful for records and specimens from these counties.

FLORA OF THE SHETLAND ISLANDS

Mr. W. Scott, Easterhoull, Scalloway, Shetland, and Mr. R. C. Palmer, 5 Oatlands Road, Oxford, are engaged in writing a new Flora of the Shetland Islands and would welcome any information on Shetland botany, records or specimens.

THE BRITISH PTERIDOLOGICAL SOCIETY

The British Pteridological Society originated in 1891, mainly with the intention of fostering the study of variation in ferns and their horticultural possibilities. Since then, however, the scope and membership has widened and the Society organises meetings and excursions designed to bring together botanists especially interested in ferns and fern-allies, both British and foreign, their taxonomy, ecology and culture.

More information may be obtained from the Acting Secretary and Treasurer, J. W. Dyce, "Hilltop", 46 Sedley Rise, Loughton, Essex.

BACK-NUMBERS OF "WATSONIA" AND "PROCEEDINGS"

Part of the Society's revenue is obtained from the sale of sets of *Watsonia* and *Proceedings* to booksellers and libraries.

Unfortunately, certain parts of both periodicals are now in short supply and it will soon become difficult to prepare complete "runs". The numbers concerned are *Watsonia*, Vol. 2, Parts 5 and 6, and Vol. 3, Part 5, and *Proceedings*, Vol. 2, Part 4. Members who have any of these parts that they no longer require are invited to assist the Society by sending them to Mr. E. B. Bangerter, c/o Dept. of Botany, British Museum (Natural History), Cromwell Road, London, S.W.7.

B.S.B.I. BOOK SERVICE

Many county Floras and other botanical books are out of print and difficult to obtain and the officers of the Society receive many enquiries from members as to where they may be obtained.

A card index of members' desiderata has now been prepared with the object of assisting them to obtain books they need to carry out their studies.

The index has been prepared by the Hon. Assistant Secretary, Mr. D. H. Kent, 75 Adelaide Road, London, W.13, and members desiring to make use of this facility are invited to write to him giving details of the books which they are anxious to acquire. A stamped addressed postcard, for reply, should be sent for each book required. It must be pointed out that some botanical works are very scarce indeed and it may be some time before they can be tracked down; every effort will, however, be made to trace copies of books required.

Members who have botanical books for disposal are also invited to write to Mr. Kent giving details of the volumes concerned and their prices.

B.S.B.I. MEETINGS IN 1961

In order that members may receive advance notice of meetings being planned for 1961 it has been decided to print preliminary details of the tentative arrangements so far made. Further data will be published later in the year, and detailed information will be sent to members early in 1961.

The Annual General Meeting will be held in Oxford on 15th April 1961, with a Field Meeting on 16th April.

A Conference on "The Preparation of County Floras and *The Comital Flora*" will be held in London.

A Field Meeting in Denmark is being arranged.

A Regional Meeting will be held at Sheffield, Yorks.

The Annual Exhibition Meeting will be held in London on Saturday, 25th November 1961.

THREATS TO BRITISH FLORA

Members are urged to report to Dr. C. D. Pigott, Botany Dept., The University, Sheffield 10, any threats to the British flora. The Council has appointed a Conservation Committee to deal with such matters and every effort will be made "to promote in every way possible the conservation of the British flora".

TOXIC SPRAYS

The Society is collecting information about the effect on native vegetation of toxic chemicals used for spraying crops. The increasing use of weed-killing chemicals on arable land implies a threat to neighbouring uncultivated land or woods since the spray can be carried a considerable distance under suitable conditions. Members who observe damage from this cause are asked to send full details to Dr. C. D. Pigott, Botany Dept., The University, Sheffield 10.

BRITISH HERBARIA

An errata sheet to *British Herbaria* has now been printed. Members wishing to receive a copy should send a stamped self-addressed envelope to Mr. D. H. Kent, 75 Adelaide Road, London, W.13.

LIBRARY FACILITIES

Members are reminded that through the kindness of the Council of the Linnean Society of London, they have the privilege of consulting the Library of the Linnean Society at Burlington House, Piccadilly, London, W.1.

ADVERTISEMENTS

A limited number of relevant advertisements will be accepted for the Society's publications as space permits. Enquiries should be addressed to Mr. D. H. Kent, 75 Adelaide Road, London, W.13.

DISTRICT SECRETARIES AND RECORDERS

The aim of the Society's local organisation, which has now been in existence for over ten years, is to serve as a channel of communication between members at a level below that of the Officers and Council and the various standing committees. It offers a means of providing more personal assistance than is feasible at the national level and at the same time affords many more members a chance of playing an active part in the Society's work than would otherwise be possible. Since it can only be effective in so far as it is used, it is hoped that as many members as possible will take advantage of the facilities offered.

Any member who is willing and able to carry out the functions of either District Secretary* or Recorder, as set out below, for any area not so far covered is invited to communicate with the Secretary of the Development and Rules Committee.

Since the functions of District Secretaries and Recorders are complementary, it is naturally expected that they will work closely together.

FUNCTION OF DISTRICT SECRETARIES

1. To keep in touch with members within their District and as far as possible *to arrange meetings for their benefit.*

2. To promote the enrolment of new members within their District.

3. To answer enquiries from members from outside their District on travel facilities, accommodation, access to private property, and similar matters of a local nature. (This does not include supplying information about localities for rare plants).

4. To keep in touch with all local institutions with a botanical connection and, as far as possible, to develop botanical interest in the District by working through one or more of the local natural history societies.

5. To assist the Hon. Meetings Secretary, Hon. Field Secretary and leaders of field meetings in connection with any meetings of the Society in their District.

6. To make regular visits, as far as possible, to habitats of special interest within their District and report without daley to the Hon. Secretary of the Conservation Committee any threat which may call for conservation measures.

FUNCTIONS OF RECORDERS

1. To promote work on, and to answer enquiries from members about, the flora of their areas. (This does not include supplying information about localities for rare plants.)

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*The position of District Secretary (replacing the Local Secretary) was only approved at the 1960 Annual General Meeting. There has, therefore, not been sufficient time for any appointments to be made at the time of going to press.

2. To assist the Hon. Editors by collecting and sending in records of more than local interest and by checking records contributed for publication; also to keep a permanent catalogue or index of all noteworthy additions to such standard Floras of their areas as may have been published.

3. To forward to the appropriate quarter information about important changes in the flora of their areas.

4. To check and help collect records on behalf of the Distribution Maps Scheme for the grid-squares in their areas.

5. To assist with the naming of non-critical material *collected within their areas.*

LIST OF RECORDERS

(revised January 1960)

The members listed below have agreed to act as Recorders for the Watsonian vice-counties in question. All addresses (except where given) can be obtained from the List of Members (see *Proceedings, B.S.B.I.*, vol. 3, pt. 4 (1960)).

REGIONS	DISTRICTS	VICE-COUNTIES	RECORDER
SOUTH WEST	*Peninsula*	0. Channel Is.	D. McClintock
		1. W. Cornwall	O. V. Polunin
		1b. Isles of Scilly	J. E. Lousley
		2. E. Cornwall	R. W. David
		3. S. Devon	Rev. W. Keble Martin
		4. N. Devon	Rev. W. Keble Martin
	Avon	5. S. Somerset	A. D. Hallam
		6. N. Somerset	N. Y. Sandwith
		7. N. Wilts	J. D. Grose
		8. S. Wilts	J. D. Grose
		33. E. Gloucester	Miss D. E. de Vesian
		34. W. Gloucester	Miss D. E. de Vesian
	Channel	9. Dorset	Prof. R. d'O. Good
		10. I. of Wight	J. E. Lousley
		11. S. Hants	Dr. J. M. Lambert
		12. N. Hants	E. C. Wallace
SOUTH EAST	*Home Counties—South*	13. W. Sussex	—
		14. E. Sussex	E. C. Wallace
		15. E. Kent	Dr. F. Rose
		16. W. Kent	Dr. F. Rose
		17. Surrey	J. E. Lousley
	Home Counties—North	18. S. Essex	B. T. Ward
		19. N. Essex	B. T. Ward
		20. Herts	Dr. J. G. Dony
		21. Middlesex	D. H. Kent
		30. Bedford	Dr. J. G. Dony
	Thames	22. Berks	Dr. E. F. Warburg
		23. Oxford	Dr. E. F. Warburg
		24. Bucks	R. M. Harley
	Anglia	25. E. Suffolk	F. W. Simpson
		26. W. Suffolk	F. W. Simpson
		27. E. Norfolk	E. A. Ellis
		28. W. Norfolk	E. L. Swann
		29. Cambridge	Dr. S. M. Walters
		31. Hunts	J. L. Gilbert

REGIONS	DISTRICTS	VICE-COUNTIES	RECORDER
MIDLANDS	*Severn*	36. Hereford	F. M. Day
		37. Worcester	F. M. Day
		38. Warwick	R. C. Readett
		39. Stafford	E. S. Edees
		40. Salop	—
	Trent	32. Northampton	I. Hepburn
		53. S. Lincoln	Miss E. J. Gibbons
		54. N. Lincoln	Miss E. J. Gibbons
		55. Leicester	Prof. T. G. Tutin
		56. Nottingham	Dr. R. W. Butcher
		57. Derby	Miss K. M. Hollick
WALES	*South Wales*	35. Monmouth	A. E. Wade
		41. Glamorgan	A. E. Wade
		42. Brecon	A. E. Wade
		43. Radnor	A. E. Wade
		44. Carmarthen	A. E. Wade
		45. Pembroke	A. E. Wade
		46. Cardigan	A. E. Wade
	North Wales	47. Montgomery	A. E. Wade
		48. Merioneth	P. M. Benoit
		49. Caernarvon	A. E. Wade
		50. Denbigh	A. E. Wade
		51. Flint	A. E. Wade
		52. Anglesey	A. E. Wade
NORTH	*Mersey*	58. Chester	W. D. Graddon
		59. S. Lancaster	Miss V. Gordon
		60. W. Lancaster	—
		71. I. of Man	D. E. Allen
	Yorkshire	61. S.-E. York	Dr. W. A. Sledge
		62. N.-E. York	Miss C. M. Rob
		63. S.-W. York	Dr. W. A. Sledge
		64. Mid-W. York	Dr. W. A. Sledge
		65. N.-W. York	Miss C. M. Rob
	Tyne	66. Durham	Prof. D. H. Valentine
		67. Northumberland (S.)	—
		68. Cheviotland	—
	Lakes	69. Westmorland	G. Wilson
		70. Cumberland	Miss C. W. Muirhead
SCOTLAND		72. Dumfries	Dr. H. Milne-Redhead
		73. Kirkcudbright	Dr. H. Milne-Redhead
		74. Wigtown	Dr. H. Milne-Redhead
		75. Ayr	R. Mackechnie
		76. Renfrew	R. Mackechnie
		77. Lanark	R. Mackechnie
		78. Peebles	P. S. Green
		79. Selkirk	B. L. Burtt
		80. Roxburgh	B. L. Burtt
		81. Berwick	P. S. Green
		82. Haddington	Dr. G. Taylor
		83. Edinburgh	Dr. G. Taylor
		84. Linlithgow	Dr. G. Taylor
		85. Fife	Miss C. W. Muirhead
		86. Stirling	B. W. Ribbons
		87. W. Perth	B. W. Ribbons
		88. Mid Perth	Miss M. S. Campbell

REGIONS	DISTRICTS	VICE-COUNTIES	RECORDER
SCOTLAND		89. E. Perth	A. W. Robson
		90. Forfar	Dr. G. Taylor
		91. Kincardine	J. G. Roger
		92. S. Aberdeen	Dr. C. H. Gimingham
		93. N. Aberdeen	Dr. C. H. Gimingham
		94. Banff	Miss M. McCallum Webster
		95. Elgin	Miss M. McCallum Webster
		96. Easterness	A. Slack
		96b. Nairn	Miss M. McCallum Webster
		97. Westerness	E. C. Wallace
		98. (Main) Argyll	E. C. Wallace
		99. Dunbarton	Prof. K. W. Braid
		100. Clyde Isles	A. C. Jermy
		101. Kintyre	Miss M. H. Cunningham
		102. S. Ebudes	Miss C. W. Muirhead
		103. Mid Ebudes	Miss C. W. Muirhead
		104. N. Ebudes	—
		105. W. Ross	E. C. Wallace
		106. E. Ross	E. C. Wallace
		107. E. Sutherland	E. C. Wallace
		108. W. Sutherland	E. C. Wallace
		109. Caithness	Miss M. S. Campbell
		110. Outer Hebrides	Miss M. S. Campbell
		111. Orkney	I. C. Hedge (Roy. Bot. Gard., Edinburgh)
		112. Zetland	D. Spence
IRELAND		All	Prof. D. A. Webb

PANEL OF SPECIALISTS

(Revised January 1960)

CRITICAL SYSTEMATIC GROUPS

List no.	
1→	*Pteridophyta.* J. A. Crabbe, A. C. Jermy, P. Taylor
36.	*Caltha* L. Prof. A. R. Clapham
46.	*Ranunculus flammula* L. and allies. Mrs. P. A. Candlish
46.	*Ranunculus* L. § *Batrachium.* Dr. R. W. Butcher, C. D. K. Cook
66.	*Fumaria* L. N. Y. Sandwith
84/4.	*Thlaspi alpestre* L. Prof. A. R. Clapham
88.	*Cochlearia* L. Prof. A. R. Clapham
97/1.	*Cardamine pratensis* L. agg. D. E. Allen
102/1, 2.	*Rorippa nasturtium-aquaticum* (L.) Hayek and *R. microphylla* (Boenn.) Hyland. H. K. Airy Shaw
113.	*Viola* L. § *Nomimium.* Prof. D. H. Valentine
113.	*Viola* L. § *Melanium.* R. D. Meikle
131.	*Cerastium* L. (annual species). E. Milne-Redhead
133/2-4.	*Stellaria media* (L.) Vill. and allies. P. M. Benoit
149/1.	*Montia fontana* L. Dr. S. M. Walters
153.	*Amaranthus* L. J. P. M. Brenan
154.	*Chenopodium* L. J. P. M. Brenan
160.	*Salicornia* L. P. W. Ball, Dr. D. H. Dalby, Prof. T. G. Tutin
162.	*Tilia* L. H. A. Hyde
163.	*Malva* L. N. Y. Sandwith
169.	*Erodium* L'Hérit. Dr. E. F. Warburg
170.	*Oxalis* L. Dr. D. P. Young
211.	*Rubus* L. E. S. Edees
220.	*Alchemilla* L. Dr. M. E. Bradshaw, Dr. S. M. Walters
220.	*Aphanes* L. Dr. S. M. Walters
225.	*Rosa* L. Dr. R. Melville
226.	*Prunus* L. Dr. R. Melville, Dr. E. F. Warburg
229.	*Crataegus* L. Dr. A. D. Bradshaw
232.	*Sorbus* L. Dr. E. F. Warburg
239.	*Saxifraga* L. Prof. D. A. Webb
254.	*Epilobium* L. T. D. Pennington
258.	*Circaea* L. P. M. Benoit
262.	*Callitriche* L. J. P. Savidge
285.	*Apium* L. R. D. Meikle
320/1.	*Polygonum aviculare* L. agg. B. T. Styles
325.	*Rumex* L. J. E. Lousley
330.	*Ulmus* L. Dr. R. Melville
335.	*Betula* L. Dr. E. F. Warburg

List no.	
342.	*Populus* L. P. G. Beak, Dr. R. Melville
343.	*Salix* L. R. D. Meikle, Dr. R. Melville, Dr. E. F. Warburg
382.	*Centaurium* Hill Dr. W. M. T. O'Connor
385.	*Gentianella* Moench. Dr. N. M. Pritchard
392.	*Symphytum* L. A. E. Wade
400.	*Myosotis* L. A. E. Wade
416.	*Verbascum* L. J. E. Lousley
430.	*Veronica* L. (aquatic species). Prof. J. H. Burnett
433.	*Rhinanthus* L. Dr. E. F. Warburg
435.	*Euphrasia* L. Dr. E. F. Warburg, P. F. Yeo
445.	*Mentha* L. R. M. Harley
448.	*Thymus* L. Dr. C. D. Pigott
465/1, 2.	*Galeopsis* L. § *Ladanum*. C. C. Townsend
485.	*Galium palustre* L. and allies. Prof. A. R. Clapham
506.	*Senecio* L. J. E. Lousley
518.	*Solidago* L. D. H. Kent
538.	*Arctium* L. Dr. W. A. Sledge
539.	*Carduus* L. Dr. W. A. Sledge
540.	*Cirsium* Mill. Dr. W. A. Sledge
544.	*Centaurea* L. E. M. Marsden-Jones
563.	*Alisma* L. J. E. Lousley
576.	*Zostera* L. Prof. T. G. Tutin
577.	*Potamogeton* L. J. E. Dandy, Dr. G. Taylor
605/18,19.	*Juncus acutiflorus* Hoffm. and *J. articulatus* L. P. M. Benoit
605/22.	*Juncus bulbosus* L. agg. D. E. Allen, P. M. Benoit
605.	*Juncus* L. (remaining species). Dr. J. G. Dony
624→	*Orchidaceae*. V. S. Summerhayes
625.	*Epipactis* Sw. C. P. Thomas, Dr. D. P. Young
643.	*Dactylorchis* (Klinge) Vermeul. Prof. J. Heslop-Harrison, Dr. P. Vermeulen
652.	*Sparganium* L. C. D. K. Cook
656.	*Eleocharis* R. Br. Dr. S. M. Walters
663.	*Carex* L. A. C. Jermy, E. C. Wallace
664→	*Gramineae*. C. E. Hubbard
670.	*Festuca* L. Dr. W. O. Howarth
672.	*Vulpia* C. C. Gmel. Dr. A. Melderis
676.	*Poa* L. Dr. A. Melderis
683.	*Bromus* L. Prof. T. G. Tutin
685.	*Agropyron* Gaertn. Dr. A. Melderis, Prof. T. G. Tutin
687.	*Hordeum* L. Dr. A. Melderis
	Charophyta. G. O. Allen

NOTES

1. The specialists' names in the above list are given in *alphabetical* order when two or more are available for consultation.
2. Specialists should be sent material *only* of the groups for which their names are listed.
3. When sending material for naming, stamps should be forwarded to cover the cost of reply. If the specimens are required to be returned, the postage should similarly be forwarded or else refunded on receipt.

4. Unless it is reasonably certain that specimens will arrive in good, fresh condition, they should preferably be sent pressed and dried or else flat in paper between stiff millboards to prevent shrivelling. They should always be legibly labelled with locality, habitat, date and any other notes likely to be of use. Whenever possible, specimens should be submitted in duplicate, so that the specialist may retain one if he so desires.
5. Discrimination should be shown in requesting specimens to be returned. Often material is of such poor quality as to be unnameable, and the trouble and cost of returning parcels are in such cases unjustifiable. It should also be remembered that material of critical groups is often of greater scientific value when located in a large regional or national collection, and determinations stand more chance of receiving revision in such places should this become necessary at some later date.
6. Specialists are not necessarily prepared to name all, or even any, of the specimens submitted. In some cases they may not have acquired sufficient knowledge of the group concerned or the nomenclature may be uncertain; in other cases the material submitted may be incomplete, without adequate data or badly prepared.
7. In the case of certain groups (e.g. *Rubus*, *Salicornia*, *Ulmus*) it is advisable to consult specialists beforehand as to the best methods of collecting or preserving material for study. In the case of groups in which extensive hybridisation is known or suspected to occur, special care should be taken to study whole populations before collecting.
8. Specialists may sometimes qualify their determinations with 'cf.' or a query, and care should be taken not to omit such qualifications when submitting records for publication.

Any member who is studying a critical group and would like his or her name added to the Panel should forward particulars to the Secretary of the Development and Rules Committee for consideration by the Committee.

NON-CRITICAL MATERIAL FOR NAMING

In order to avoid overstraining the resources of the Society, members wishing to have non-critical material named are asked to consult local museums or herbaria as far as possible. The Society's Recorders will, however, normally be willing to name limited quantities of non-critical material from any vice-county *for which such Recorders are listed* as far as they are able. It is unreasonable to send Recorders large numbers of specimens, unless it has previously been ascertained from them that they are in a position to receive them. *On no account should specimens for naming be sent to the Hon. General Secretary or to other Officers*—except, of course, in so far as they may otherwise be Specialists or Recorders. In general, the same procedures should be followed as are set out above for the submitting of critical material.

MISCELLANEOUS SUBJECTS

Biographical Details of British Botanists : D. H. Kent
Botanical Apparatus and Material : E. Milne-Redhead
Botanical Specimens, Preparation of : E. Milne-Redhead
Cytology in Relation to Systematics : Dr. E. F. Warburg
Ecology : Prof. A. R. Clapham
Folk Lore : D. E. Allen
Foreign Floras and Foreign Field Work : W. T. Stearn
Genetics in Relation to Systematics : Prof. D. H. Valentine
Herbals : Dr. G. W. T. H. Fleming
History of British Botany, before Linnaeus : Rev. Canon C. E. Raven.
History of British Botany, Linnaeus and after : J. S. L. Gilmour

Local Floras : N. Douglas Simpson
Maps : E. Milne-Redhead
Mapping, Methods of : W. T. Stearn
Nomenclature : J. E. Dandy
Phenology and Meteorology : F. N. Hepper
Popular Names : Miss C. M. Rob
Private Herbaria, Location of : D. H. Kent, J. E. Lousley
Systematic Works and Monographs : N. Y. Sandwith
Vice-County Boundaries : J. E. Dandy

Members wishing to avail themselves of the privilege of consulting the specialists in the list should write to them direct and enclose a stamped addressed envelope for reply (addresses in Members' List)

RULES

(As passed at the Annual General Meeting held on 9th April 1960)

NAME

1. The name of the Society shall be The Botanical Society of the British Isles.

OBJECTS

2. The objects of the Society shall be:

   (a) To promote the investigation in the field of the Flowering Plants, Vascular Cryptogams, and Charophyta in relation to the British Isles and to encourage their botanical study.

   (b) To facilitate the exchange of information among botanists by organising field meetings, conferences, lectures, and exhibitions, and by other means.

   (c) To promote in every way possible the conservation of the British flora.

   (d) To issue and support such periodicals and other publications as the interests of the Society require.

   (e) To aid in the maintenance of adequate representative collections of British plants in the national and other public herbaria.

MANAGEMENT OF THE SOCIETY

3. The management of the affairs and property of the Society shall be in the hands of a Council consisting of the Officers and nineteen elected members.

4. The Council shall each year appoint from their own body, with or without the addition of other members, the following Permanent Working Committees to which shall be delegated such powers and duties as may be laid down by Council in Standing Orders for those Committees. Such Standing Orders may be amended by Council provided two-thirds of the votes cast are in favour of the change.

   (a) Development and Rules
   (b) Meetings
   (c) Junior Activities
   (d) Conservation
   (e) Publications

5. The Council may also appoint from their own body, with or without the addition of other members, such Special Committees as they may determine and shall define all duties and powers of such Committees and the number of members to form a quorum thereof and may delegate any of their powers and duties to such Committees.

THE OFFICERS

6. The Officers of the Society shall be a President, not more than four Vice-Presidents, Honorary General Secretary, Honorary Treasurer, an Honorary Editor or Editors, Honorary Meetings Secretary, Honorary Field Secretary and Honorary Junior Activities Secretary.

7. (a) The Honorary General Secretary shall carry out all ordinary secretarial duties of the Society as directed by the Council. One or more Honorary Assistant Secretaries may be appointed by the Council to assist the Honorary General Secretary in such ways as the Council may determine.

(b) The Honorary Treasurer shall keep the Society's accounts. An Honorary Assistant Treasurer may be appointed by the Council to assist the Honorary Treasurer in such ways as Council may determine.

(c) The Honorary Meetings Secretary shall be Secretary of the Meetings Committee and shall be responsible for the Society's indoor meetings organised by that Committee.

(d) The Honorary Field Secretary shall co-ordinate all field work organised by the Society and shall be responsible for the Society's Field Meetings organised by the Meetings Committee. He shall be *ex officio* a member of Meetings and Junior Activities Committees.

(e) The Honorary Junior Activities Secretary shall be Secretary of the Junior Activities Committee and shall be responsible for the meetings for younger members organised by that Committee and shall be an *ex-officio* member of the Meetings Committee.

(f) The Honorary Editor or Editors shall edit the Society's periodicals and shall be responsible for the abstracting and reviewing of publications received by the Society. The Editors shall be *ex officio* members of the Publications Committee.

8. The President, Honorary General Secretary and Honorary Treasurer shall be *ex officio* members of all Permanent Working and Special Committees.

ELECTION OF OFFICERS AND COUNCIL

9. The President and Vice-Presidents shall be elected to serve for a term of two years and shall not be eligible to serve for a period of more than four consecutive years in each office; the other Officers shall be elected annually and shall be eligible for re-election each year. Nominations for Officers shall be made by the Council for election at the Annual General Meeting.

10. Twelve members of the Council shall be elected at Annual General Meetings, three of these shall retire every year by rotation in order of seniority; the seniority of members to be determined by drawing lots at the time of their election. All nominations for such

vacancies on the Council shall be in writing, signed by two members of the Society, shall be accompanied by the written consent of the candidate to serve if elected, and shall be sent to the Honorary General Secretary before February 1st in each year. In the event of an insufficient number of nominations being received before February 1st to fill the vacancies, the Council shall have power to make the necessary nominations.

11. Seven members of the Council shall be elected, one from each of the seven regions of the Society as defined in Schedule 1*. A meeting of the members normally resident in each region (hereinafter called a Regional Meeting) will be held in that region at least once in four years when part of the business will be to elect one of their number as a member of the Council. Notice of a Regional Meeting shall be given at least three months in advance and nominations shall be in writing, signed by two members of the Society resident in the region and accompanied by the written consent of the candidate to serve if elected. In the event of a nomination not being received eight weeks before the date of the meeting the Council shall have the power to make a nomination.

12. No member elected to the Council shall be eligible for re-election for a period of one year after his retirement from the Council.

13. In cases of emergency the Council shall have power to make urgent temporary appointments at their own discretion.

MEETINGS OF COUNCIL

14. The Honorary General Secretary shall be authorised to call a meeting of the Council upon the written request of the President or of not fewer than three members of the Council. Each member shall receive not less than seven days' notice of a proposed meeting. The Honorary General Secretary in consultation with the President may, if necessary, call a meeting of the Council without notice immediately after the Annual General Meeting.

15. A quorum at a meeting of the Council shall consist of five members.

16. Any member of the Council or of a Committee who fails to attend three consecutive meetings shall cease to be a member thereof unless adequate reason for non-attendance is given. Decision on such removal shall be made by the Council. Vacancies on the Council caused in this way or by death or resignation may, when urgently necessary, be filled by the Council in advance of a General Meeting. Temporary appointments to fill vacancies on Committees may, when urgently necessary before the next meeting of the Council, be made by the Officers in consultation with the Committee.

DISTRICT SECRETARIES AND RECORDERS

17. The Council shall appoint District Secretaries for each of the districts as defined in Schedule 1 who shall call local meetings and

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*See p. 127.

answer any enquiries about transport and accommodation, access to private property and such other matters of a local character as may arise.

18. The Council shall appoint Recorders for each vice-county, who shall assist the Editors by collecting records of more than local interest and by checking records contributed for publication, who shall forward to the appropriate quarter information about important changes in the flora and who shall be responsible for the naming of non-critical specimens collected in their areas.

PANEL OF SPECIALISTS

19. The Council shall appoint a Panel consisting of persons each of whom is prepared to deal with enquiries on specified groups of plants or on subjects connected with the objects of the Society. The Panel shall from time to time be reviewed by the Council, and any alterations shall be notified to Members.

FINANCES OF THE SOCIETY

20. The Society's invested funds and banking account shall be in the name of the Society and shall be operated by the Honorary Treasurer.

21. The Council shall have power to adopt such financial measures as may seem to them to be expedient in the interests of the Society.

22. An auditor shall be appointed by the members at the Annual General Meeting and the accounts, having been audited by him, shall be approved by the Council before presentation to the next Annual General Meeting.

MEMBERSHIP

23. The following are the categories of membership:—

    (a) *Ordinary Membership* of the Society is open to all persons interested in botany who comply with Rule 24 and pay the current subscription, which shall entitle them to the privileges of membership until the 31st day of December of the current year.
    (But see also Rule 27.)

    (b) *Junior Membership.* Persons under the age of 21 years may join the Society as Junior Members on payment of half the annual subscription payable by Ordinary Members. Payment of this sum shall entitle a Junior Member to the privileges of membership until the 31st day of December of the current year. A Junior Member will cease to be a Junior Member on the 31st day of December of the year in which he reaches the age of 21 years, and may then become an Ordinary Member without being again proposed and seconded.

(c) *Family Membership.* Members of the family of an Ordinary Member who do not wish to receive copies of the Society's periodical publications may, at the discretion of the Council, be elected members of the Society on payment of such reduced subscription as the Council shall from time to time decide; such members shall have all the other privileges of Ordinary Members. Enquiries concerning Family Membership should be addressed to the Honorary General Secretary.

(d) *Life Membership.* Members who have already compounded for Life Membership shall continue to enjoy all the privileges of Ordinary Members. No further Life Members shall be accepted for the present.

(e) *Honorary Membership.* Botanists, whether British or Foreign, who have rendered special service to the Society or its objects may, on the recommendation of the Council, at a General Meeting, be elected Honorary Members, who shall enjoy all the privileges of membership. Nominees for Honorary Membership shall, before their names are submitted by the Council to a General Meeting, obtain the votes of not less than three-quarters of those present in Council. The numbers of Honorary Members shall not be added to when the sum total of such members exceeds five per cent. of the total paying members of the Society as on the last day of the preceding year.

(f) *Subscriber Members.* Botanical or Natural History Societies, Libraries, Museums, Botanical Gardens, Schools, and similar Institutions which are unable to conform with the conditions of Rule 24 shall be entitled to become Subscriber Members at the rate of subscription applicable to Ordinary Members. They shall be entitled to the privileges of ordinary membership except that they shall be entitled to send not more than one representative to any meeting of the Society (other than to Junior Meetings), and only accredited representatives of Societies shall be entitled to vote. They shall consult the Panel only through their secretariat. They are expected to support the objects of the Society and to accept the responsibilities of Ordinary Membership as far as applicable, and their acceptance and retention as Subscriber Members is subject to the absolute discretion of the Council.

24. Candidates for membership shall be proposed and seconded by members of the Society and upon receiving a copy of the Rules shall sign a Form of Declaration of their willingness to support the objects of the Society and accept the responsibilities of membership.

ANNUAL SUBSCRIPTION

25. The Annual Subscription shall be an amount recommended by the Council and approved by the members at a General Meeting.

26. Annual subscriptions are payable upon first day of January in each year.

27. The annual subscription of members who join the Society on or after the first day of October shall cover the period ending on the thirty-first day of December of the following year.

28. Notice shall be given to every member of his subscription being due.

29. Any member whose subscription shall be in arrear for one year on the first day of January in any year shall cease to be a member.

PRIVILEGES OF MEMBERSHIP

30. Each member of the Society shall be entitled:—

    (a) To receive one copy of the Society's periodicals as issued (except as provided under Rule 23 (c)).

    (b) To submit plants for naming to the Recorders or to the specialists on the Panel. Return postages shall be prepaid by the sender.

    (c) To consult the Officers, District Secretaries, Recorders and the Panel upon botanical matters.

    (d) To submit papers and notes for consideration for publication by the Society.

    (e) To attend, and vote at, meetings and, so far as accommodation and transport are available, to attend field meetings of the Society.

    (f) To invite guests to attend field meetings and certain other meetings, subject to the discretion of the Council.

RESIGNATION

31. Any member wishing to resign from his membership shall give written notice to the Honorary General Secretary or Honorary Treasurer before the first day of December in any year of his intention to resign, failing which he shall be liable for the payment of his subscription for the ensuing year.

EXPULSION FROM MEMBERSHIP

32. If it be proved at any time to the satisfaction of the Council that any member has acted in any way contrary to the objects or derogatory to the interests of the Society, the Council shall make a report on the matter to the next General Meeting; on a vote of not less than two-thirds of the members present at such meeting in favour of expulsion, the member concerned shall cease to be a member of the Society and shall forfeit any claim upon the Society; he may subsequently, however, be reinstated, but only by ballot of the members present at an Annual General Meeting.

CHAIRMANSHIP OF MEETINGS

33. At all General and Council meetings the Chair shall be taken by the President or, in his absence, by a Vice-President. In the absence of both, the Chair shall be taken by a member of Council elected at the meeting. When there is an equality of votes at any Council or General Meeting, the Chairman shall have a second, or casting vote.

GENERAL AND REGIONAL MEETINGS

34. The Annual General Meeting shall be held in March or April in each year at such time and place as the Council shall direct.

35. The Honorary General Secretary shall, by direction of the Council, or at the written request of not fewer than twenty-five members, call a Special General Meeting for the consideration of any business of interest to the Society.

36. Notice of a General Meeting, and the agenda of such meeting, shall be sent to every member by post at least fourteen days before the date of the meeting.

37. A quorum at General and Regional Meetings shall be seven members.

38. Voting at General and Regional Meetings shall be conducted by show of hands, but on the ruling of the Chairman, or on the demand of not fewer than five members present, voting shall be by ballot (and see Rule 32). All elections to the Council under Rules 10 and 11 shall be by ballot. All ballot papers must be tendered personally.

ALTERATION OF RULES

39. No Rule shall be made or altered except at a General Meeting, and then only after twenty-eight days' notice has previously been given in writing to the Honorary General Secretary, who shall give fourteen days' notice to all members of the Society of the proposed addition or alteration to the Rules. Not less than two-thirds of the votes of those present must be in favour of change before any alteration of Rule is made.

SCHEDULE I

Region I—South West		
District A	Peninsula	v.c. 0-4.
B	Avon	v.c. 5-8, 33, 34.
C	Channel	v.c. 9-12.
Region II—South East		
District A	Home Counties (South)	v.c. 13-17.
B	Home Counties (North)	v.c. 18-21, 30.
C	Thames	v.c. 22-24.
D	Anglia	v.c. 25-29, 31.
Region III—Midlands		
District A	Severn	v.c. 36-40.
B	Trent	v.c. 32, 53-57.
Region IV—Wales		
District A	South Wales	v.c. 35, 41-46.
B	North Wales	v.c. 47-52.
Region V—North		
District A	Mersey	v.c. 58-60, 71.
B	Yorkshire	v.c. 61-65.
C	Tyne	v.c. 66-68.
D	Lakes	v.c. 69-70.
Region VI —Scotland		v.c. 72-112.
Region VII—Ireland		v.c. H1-40.

SCHEDULE II

The following are the terms of reference to which the Permanent Working Committees are required to adhere.

(a) *Development and Rules.* To undertake periodic reviews of the Panels of Specialists and List of Local Officers, to deal with suggested alterations of the Rules and to consider other matters concerning the future development of the Society.

(b) *Meetings.* To organise, co-ordinate and present reports of, all meetings of the Society, other than business meetings.

(c) *Junior Activities.* To consider how the Society can make known its activities to, and to cater for, young botanists, and to organise meetings on their behalf in co-ordination with the Meetings Committee.

(d) *Conservation.* To take any action which may be desirable to conserve the British flora, either alone or in collaboration with the Nature Conservancy or other bodies.

(e) *Publications.* To assist and advise the Editors of the Society's periodical publications and to appoint Editors of such other publications (apart from programmes, notices, forms and other similar publications of a purely administrative nature) as the Council may approve, and to assist these Editors in their work.

The following are the Standing Orders of the Permanent Working Committees of the Society.

1. Committees shall work within the terms of reference laid down by the Council and such terms may be amended only by a majority vote at a meeting of the Council. A Committee may refer any appropriate matter to another Committee without first bringing such matter to the attention of the Council.

2. (a) An *ad hoc* Chairman shall be elected from the members present at each meeting of the Committee.

   (b) Except where otherwise provided in the Rules, the Secretary of the Committee shall be elected by the members of the Committee from their own number at their first meeting of a session. The Secretary shall be responsible for keeping the minutes of each meeting and shall submit a report of the decisions made at each meeting to the next meeting of the Council. A record of any receipts and payments incurred by the Secretary on behalf of the Society shall be kept and shall be submitted to the Treasurer of the Society. The Secretary may, at the discretion of a Committee, delegate any of his duties to any other member of the Committee.

3. Meetings of a Committee shall be called at the discretion of the Secretary of the Committee except that he shall be required to call a meeting upon receiving a written request signed by at least three members of the Committee. At least ten days' notice shall normally be given of the calling of a meeting. A quorum for any meeting of a Committee shall be three.

4. Committees shall have power to co-opt.

BRITISH HERBARIA

An Index to the Location of Herbaria of British Vascular Plants

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with the assistance of
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Enquiries about membership and publications will be welcomed by the General Secretary, Mrs. L. M. P. Small, 13 Woodfield Crescent, Ealing, London, W.5.

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Continued from inside front cover

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LIST OF BRITISH VASCULAR PLANTS

prepared by J. E. DANDY for the British Museum (Natural History) and the Botanical Society of the British Isles

Many botanists have assisted in the preparation of this work, which incorporates the *London Catalogue of British Plants* and was undertaken by Mr. Dandy on behalf of a sub-committee of the Society appointed for this purpose. It was published in the summer of 1958.

Dr. George Taylor, Director of the Royal Botanic Gardens, Kew, and a former President of the Society, writes in a foreword: 'British botanists have been unusually fortunate in having Mr. Dandy's unequalled knowledge of nomenclature and sure taxonomic insight placed so generously at their disposal. There has been a pressing need for a new British plant list and that deficiency has been most worthily met'.

The names used in the list are now used in the publications of the Society and will without doubt become adopted by British botanists generally. Synonyms relating to previous lists are given, and the list will prove invaluable to members as a work of reference. Genera and species are numbered, making the list useful for the arrangement of herbaria and local lists of plants.

Demy 8vo., 176 + xvi pages. Bound in cloth, Price 10/-;
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Obtainable from E. B. BANGERTER, c/o Department of Botany, British Museum (Natural History), Cromwell Road, London, S.W.7.

Published August 1960

A BIBLIOGRAPHICAL INDEX OF THE BRITISH FLORA

COMPILED BY

N. DOUGLAS SIMPSON, M.A., F.L.S.

The purpose of this work is to provide references to sources of information whereby flowering plants, vascular cryptogams and Charophytes found in Britain may be identified, their history traced and their geographical range determined. In addition, information is provided on plantlore, local names, poisonous plants and weeds.

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Editor: D. H. KENT

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Continued on inside of back cover

VIOLA RUPESTRIS SCHMIDT IN BRITAIN

By D. H. Valentine and M. J. Harvey
(The Durham Colleges, University of Durham)

Viola rupestris Schmidt was first discovered in Britain on Widdy Bank Fell in Upper Teesdale by James Backhouse in 1862. The discovery was described by Babington (1863) and until recently this has remained the only British locality. The purpose of this paper is to record and describe briefly two new localities, both in Westmorland (V.c.69), one at Arnside and the other on Long Fell on the Pennine scarp.

The clue to the Arnside locality was provided by two sheets in the Herbarium at Kew. The labels on the two sheets are similar; the author's name, so far as it can be made out, is T. F. Cuthwick, the date April 1927, and the locality Arnside, Westmorland. One sheet bears three small plants, the other two; they are substantially identical and both sheets are labelled *Viola riviniana* forma *minor*. These sheets were first examined (by D.H.V.) in 1939 when it was noted that the leaf shape was like that of *V. rupestris,* and that the petioles and peduncles were densely hairy (a *V. rupestris* character); the rather broad stipules were also thought to be more suggestive of *V. rupestris* than *V. riviniana.* The opinion was formed that the plants might be either *V. rupestris* or its hybrid with *V. riviniana* and a note to this effect was put on the sheets.

Because of the War, no immediate steps could be taken to follow up this clue, and in fact nothing was done until, in January 1960, the specimens were again looked at, by M.J.H., who agreed with the previous diagnosis; and it was decided to visit Arnside to look for the plant. The visit was made in May 1960 and the plant was discovered on Arnside Knott.

The discovery at Arnside encouraged a search of several other localities. In 1881 *V. rupestris* was recorded by Backhouse from Long Fell, Warcop, Westmorland, but an examination of the specimens from Backhouse's herbarium, now in the herbarium of the Royal Botanic Garden, Edinburgh, showed that all 5 plants on the sheet were *V. riviniana.* However, a trip to Long Fell in August 1960 revealed *V. rupestris* growing along the edge of the fell overlooking the Vale of Eden. We shall now give a short description of the Arnside and Long Fell populations and their habitats.

THE ARNSIDE POPULATION

This is small, and consists of probably one or two hundred plants in an area about twenty yards square at the top of a steep cliff at a height of 450 feet (150 m.). The flat top of the hill behind the cliff probably once carried a woodland of oak, ash and yew, but plantings have been made and there is now a good deal of sycamore; and the slopes of the hill on either side of the cliff carry plantations of pine and larch. The cliff face itself is unstable limestone scree with very little vegetation though there are one or two larch and pine trees and an occasional sycamore seedling; but near the top there are small outcrops of solid rock which are stable and which carry an open vegetation in which *Sesleria caerulea, Festuca ovina, Helianthemum chamaecistus* and *Thymus drucei* are the main species. It was in this open but fairly stable vegetation, and also in the more closed grassland immediately above, that *V. rupestris* occurred.

At the time of the visit the plants were small but vigorous, one to two inches in height; a single plant was still in flower and two or three were carrying ripening fruit which had been produced from the open flowers. It was too early for cleistogamous flowers and fruit to be visible, but a second visit, in June, showed that these were produced in abundance.

The list of species in the area is given in Table 1 (p. 134). The surface of the ground was irregular with small pieces of limestone in it at frequent intervals and the soil was a very shallow chocolate-brown loam two or three inches in depth with a pH when fresh of about 8·4. It was estimated that about 30% of the ground was devoid of vegetation and there was evidence of slight rabbit grazing.

The *Viola rupestris* plants were quite typical of the species in leaf-shape and indumentum and there was no question of confusing them with small plants of *V. riviniana,* of which only one or two were seen in the area investigated. The single flower still open was white—a character known in some European populations but not in the Teesdale population in which the flowers are always blue. One plant from Arnside has been brought into cultivation for a detailed comparison with the Teesdale and Long Fell plants, and for a chromosome count.

THE LONG FELL POPULATION

Here *Viola rupestris* occurs over a large area. It is found on the south-west edge of the fell on Carboniferous limestone along a strip half a mile long and up to 50 yards wide, at an altitude of just under 1,950 feet (600 m.). Away from the edge of the cliff the moorland vegetation is little influenced by the limestone beneath, while the scarp face itself is either unstable rock and scree or relatively long grass. Only the edge of the cliff appears to have the combination of very short turf with a very base-rich soil. The whole area is treeless.

Despite the large area over which *V. rupestris* plants are found they are very sparsely scattered, and, although seen in August when the plants had attained their maximum size, they were very dwarf; no rosette was more than 1½ inches in diameter and many were much less. The generally depauperate nature of the plants is probably attributable to their occurrence in a more closed turf than at Arnside and Widdy Bank and to the greater altitude. Their low vigour is shown by the fact that out of a hundred or so plants examined in 1960 only three had the remains of a capsule attached, while in the same year the plants at Arnside produced many capsules per plant, and those on Widdy Bank a moderate quantity.

The ground on which the violet occurs is gently sloping, with numerous rocks breaking the surface and near a narrow strip of limestone pavement. The soil is black, shallow and of pH 8·3 (fresh soil). Although the ground is rocky, most of the violet rosettes occur in the fairly dense turf of *Sesleria caerulea, Festuca ovina* and *Thymus drucei*. In its main species the vegetation differs from that at Arnside and Widdy Bank only in the absence of *Helianthemum chamaecistus,* although this occurs a mile away at a lower altitude on the adjacent Middle Fell, from which, however, the violet appears to be absent. The other species found with *Viola rupestris* are given in Table 1. The area has previously been mined for lead and barytes and at present is used as an artillery range and for sheep grazing, and there are also rabbits present. Three small plants were dug up for a chromosome count and for comparison in cultivation with other stocks.

COMPARISON OF POPULATIONS

It is intended to compare the three populations by growing seedlings side by side under uniform conditions so that heritable differences can be detected. Meanwhile it is possible to make a few observations on one season's growth of the Arnside and Teesdale plants. These were deliberately chosen in May 1960 to be of similar size and were grown in the same soil mixture and the same-sized pots. By the end of the growing season in September, the plants were of quite dissimilar appearance; the Arnside plant had a few long shoots and the growth was not compact, while the Teesdale plant was compact with many very short shoots. Although it would be rash to draw any firm conclusions from results with so few plants, previous experience with various species of *Viola* has shown that in many cases such differences are heritable. Thus, observations on a number of Czechoslovakian populations of *V. rupestris* made in the field and in cultivation have shown considerable inherited variation in habit, size and indumentum. In Czechoslovakia, as in England, the species is generally restricted to rather open, base-rich habitats and the populations are disjunct. These facts, taken with the considerable extent to which seed is produced from cleistogamous flowers, means that local populations will tend to consist of more or less homozygous individuals which may be expected to differ from habitat to habitat and which may have become adapted to local conditions. For instance, the dwarf nature of the Teesdale stock may be the result of natural selection under the heavy grazing pressure on the outcrops of limestone on which the plants grow.

These outcrops are surrounded by miles of acid moorland; and grazing animals are attracted to them and leave the grass only 1 to 2 inches high. On the other hand, the Arnside locality is relatively inaccessible and is set in an area with many square miles of limestone, so that grazing is probably light.

The chromosome numbers of the Arnside and Long Fell plants have been counted in root tip squashes and both have $2n=20$. This is the same as for the Teesdale plants and three populations examined in Czechoslovakia, and the same number has been recorded by other authors for other populations.

It is interesting to compare the Arnside, Long Fell and Teesdale habitats and a plant list for the *V. rupestris* area in Teesdale is included in Table 1. The latter area extends for some hundreds of yards along the south-facing slopes of Widdy Bank Fell at a height of 1,650 feet. The occurrence of *V. rupestris* is limited to the sugar limestone which is, as in the other areas, of Carboniferous age, but has been metamorphosed by contact with the Whin Sill into sugar-like crystals. The pH of the soil near the edge of the outcrops is 8·3. In all three areas *V. rupestris* is limited to open ground at or near the edge of the outcrops though on Widdy Bank these are only 2 or 3 feet high. Widdy Bank has a far greater number of *V. rupestris* plants than Long Fell, and Arnside has very few indeed.

Reference to the lists in Table 1 shows that the three areas resemble one another in that *Festuca ovina* and *Sesleria caerulea* are the main components of the vegetation and that *Thymus drucei* is frequent. The differences reflect the differences in altitude and climate. The Teesdale and Long Fell areas are at 1,650 and 1,950 feet respectively, and they carry montane species such as *Draba incana, Gentiana verna, Minuartia verna, Plantago maritima, Polygonum viviparum,* and *Selaginella selaginoides*; species such as *Asperula cynanchica* and *Carlina vulgaris,* which do not ascend above 1,500 feet in Britain, are absent. The differences in climate between the three localities must be considerable; the average temperatures on the Long Fell and Teesdale localities are certainly much lower than at Arnside and the rainfall higher, though exact data are not available.

It would thus appear that the nature of the habitat (open, sunny, well drained, shallow soil, high base-status) is very similar in the three areas, and there is a general resemblance in the main components of the vegetation although the detailed differences in vegetation reflect very different climatic conditions; it is interesting that *Viola rupestris* has been able to survive in all three areas. It would suggest that the species, provided certain habitat conditions are satisfied, has a wide climatic tolerance, and this would agree with its extraordinarily wide distribution in Eurasia.

From the phytogeographical point of view the discovery of *V. rupestris* at Arnside and Long Fell is not unexpected. As is well known, and as shown in the distribution table in Pigott and

Walters (1954), several British species with disjunct distributions, belonging to the group which tends to occur in open base-rich habitats, are known from the limestones of Westmorland. Thus *Hippocrepis comosa* is known from Arnside and from Hillbeck Fell (near Long Fell) and it has an old locality on Cronkley Fell in Teesdale. Also found at Arnside is *Veronica spicata,* and a few miles away on Whitbarrow and Underbarrow Scars occurs *Helianthemum canum* which is also in Teesdale. The moss *Rhytidium rugosum* is also known from Arnside and Teesdale, and like *V. rupestris,* is to be interpreted as a plant which was widespread in late-glacial times and has survived through subsequent forest periods only in a few specialised habitats. The *V. rupestris* Arnside habitat, though at the margin of a wood, is now open and, because of the steepness of the slope and the instability of the substratum, may well have been so throughout post-glacial time, though there may have been a partial forest cover. At least some portions of this very steep limestone slope have probably always been open, especially as it is south-facing and likely to be very dry in summer.

These discoveries encourage the idea that *Viola rupestris* may be found in other places too. The limestones of north and west England, especially the Craven district of Yorkshire, would seem to possess many possible localities and need searching with *V. rupestris* specifically in mind, since it is not a plant which is likely to be found by accident.

Analogy with other species with similar habitats and distributions also leads one to suspect that *V. rupestris* may yet be found in southern England in the Breckland area. Admittedly this is a less likely area than the north of England since it has already been very intensively explored botanically, but *V. rupestris* is by no means an oceanic species and it is in fact placed by Hultén (1950) in his West-Siberian Continental element; there is no reason why it should be restricted in Britain to the north and west. It is perhaps worth recalling here the recent work on the distribution of *Carex ericetorum* in Britain. This sedge grows in similar habitats to *V. rupestris* and has a general resemblance to the spring sedge, *Carex caryophyllea,* just as *V. rupestris* resembles the common dog violet, *V. riviniana.* Until 1943 *Carex ericetorum* was known in Britain only from the Breckland area, but in that year was reported by E. C. Wallace from near Harrogate and has since been discovered in many other localities in the north of England. It is hoped that this report of *V. rupestris* will similarly stimulate a series of fresh discoveries.

There are many specimens in British herbaria, particularly the Druce Herbarium at Oxford, which were identified as *V. rupestris* both by G. C. Druce and E. S. Gregory; but, as pointed out by P. M. Hall (1939), these are misidentifications and the plants are all forms of *V. riviniana. V. rupestris* differs from *V. riviniana* in having generally smaller, more rounded leaves, broader stipules, narrower lip-petal with fewer and less marked veins, and in particular by a dense pubescence of short hairs on stems, petioles and capsules (although glabrescent forms are known in Europe). Any violet growing in an open limestone or chalk soil, looking like *V. riviniana* but with a pubescent petiole and capsule, is likely to be *V. rupestris,* or its hybrid with *V. riviniana.* This hybrid, which is triploid and sterile, has been recorded in moderate quantity from Widdy Bank (Valentine, 1949), where the two species, though occupying distinct types of habitat, may grow very close together. It is quite likely that further search will lead to the discovery of the hybrid on Long Fell, where again the two species are in rather close contact.

In conclusion we should express our indebtedness to T. F. Cuthwick, who first collected the specimens from Arnside, and to J. Backhouse for his 1881 record for Long Fell, which we are pleased to be able to confirm.

The junior author acknowledges, with thanks, the financial support of the Department of Scientific and Industrial Research during the period in which this work was done.

TABLE 1

PLANT COMMUNITIES IN WHICH *VIOLA RUPESTRIS* OCCURS

	'A'	'B'	'C'
AGROSTIS TENUIS	—	2	3
BRIZA MEDIA	—	1	1
CAREX CAPILLARIS	—	—	2
C. CARYOPHYLLEA	—	3	2
C. ERICETORUM	1	—	2
C FLACCA	—	3	1
FESTUCA OVINA	5	7	8
KOELERIA CRISTATA	—	1	2
LUZULA CAMPESTRIS	—	1	—
SESLERIA CAERULEA	5	8	5
ASPERULA CYNANCHICA	1	—	—
CAMPANULA ROTUNDIFOLIA	3	1	2
CARLINA VULGARIS	1	—	—
CENTAURIUM ERYTHRAEA	1	—	—
CERASTIUM HOLOSTEOIDES	—	1	1
CHRYSANTHEMUM LEUCANTHEMUM	1	—	—
DRABA INCANA	—	1	1
EUPHRASIA sp.	—	1	1
FRAGARIA VESCA	1	—	—
GALIUM PUMILUM	1	1	1
GENTIANA VERNA	—	—	1
GENTIANELLA AMARELLA	—	1	1
HELIANTHEMUM CHAMAECISTUS	4	—	5
HIERACIUM PILOSELLA	1	—	—
H. VULGATUM	1	—	—
LINUM CATHARTICUM	—	1	1
LOTUS CORNICULATUS	—	1	1
MINUARTIA VERNA	—	1	1

Table 1—*Continued*

Plantago maritima	—	—	1
Polygonum viviparum	—	—	2
Rubus fruticosus	1	—	—
Scabiosa columbaria	—	1	—
Taraxacum laevigatum	1	1	1
Teucrium scorodonia	2	—	—
Thymus drucei	4	5	3
Viola hirta	1	—	—
V. riviniana	1	1	1
V. rupestris	2	1	3
Asplenium ruta-muraria	1	—	—
Selaginella selaginoides	—	—	1
Ctenidium molluscum	—	+	+
Encalypta streptocarpa	+	+	+
Grimmia apocarpa	+	—	+
Hypnum cupressiforme	—	+	+
Rhacomitrium lanuginosum	—	+	+
Rhytidium rugosum	—	—	+
Tortella tortuosa	+	+	+

'A' = Arnside, 450 feet altitude, S.E. facing slope, pH 8·4, 30% bare ground.

'B' = Long Fell, 1,950 feet altitude, S.W. facing slope, pH 8·3, 5% bare ground.

'C' = Widdy Bank, 1,650 feet altitude, S.W. facing slope, pH 8·3, 10% bare ground.

The figures listed in the Table represent cover and frequency as estimated on the Domin scale.

Only the more abundant bryophytes are listed.

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THE IMPORTANCE OF THE BRITISH COLLECTIONS IN THE SLOANE HERBARIA

By Phyllis I. Edwards

Sir Hans Sloane was born on 10th April 1660 at White's Castle, County Down, Ireland. Of his childhood little is known. An authoritative account of his life, and the source for later biographies by Sir Gavin de Beer and W. E. J. Brooks, is the manuscript by Dr. T. Birch, Secretary of the Royal Society (British Museum Add. MSS. 4241). Sloane came to London in 1679, studied there, and later in France. While in London he furthered his study of plants at the Chelsea Physic Garden which had been established a few years earlier, in 1673, when the Apothecaries' Society obtained the lease of a plot of three and a half acres in Chelsea, from Charles, afterwards Lord Cheyne. This association with the garden deepened into a lifelong interest and concern for its wellbeing and development.

In Paris, Sloane studied in the Royal Garden of Plants under Tournefort, whose teaching was based on Caspar Bauhin's 'Pinax'. Tournefort was both physician and botanist, and soon recognised in Sloane a kindred spirit. He was also a collector of curiosities of all kinds, and he too was to bequeath his museum to his country, in fact to the French King, so as to preserve it for all time. To complete his botanical instruction, Sloane went to Montpellier to learn plant classification from Magnol.

For Sloane, the most important botanical influence was, perhaps, his friendship with John Ray, which commenced on his return from Europe in 1684. Ray was England's foremost naturalist, whose greatest contribution was to advance the much-needed science of the classification of both plants and animals.

Sloane made small collections of plants in England and in Europe: Herb. Sloane, Vol. 9, 'Plants gathered in the fields and gardens about London about the year 1682'; and Vol. 11, 'Plants, mosses, etc., gathered about London, etc., 1689'. He also offered specimens to Ray when he heard of his projected 'Historia generalis plantarum'.

In 1687 Sloane had the opportunity to accompany the Duke of Albemarle, as his physician, on the Duke's appointment as Governor of the island of Jamaica. Sloane, to quote his own words in the preface to his 'Natural History of Jamaica', "wished to cast my mite towards the advancement of natural science". As there was some doubt whether Sloane would accept the commission, Ray wrote to him—"hoping he gets to Jamaica so that much light might be given to the history of American plants, by one so well prepared for such an undertaking by a comprehensive knowledge of the European", adding, in a later letter—"we expect great things of you". Ray further suggested some problems that he would like investigated. Sloane, while in Jamaica, found he was able to clear up the confusion relating to the identity of some West Indian plants. He published the results of his researches in his first work, *Catalogus plantarum quae in Insula Jamaica sponte proveniunt,* 1696. Ray made use of this information in the third volume of his *Historia Plantarum generalis,* 1704. Sloane's collections from Jamaica brought him immediate fame and recognition, which was further enhanced when he published his monumental account of his journey, his *A voyage to the islands Madera, Barbados . . . . and Jamaica, with the natural history of the last of those islands,* 2 Vols., 1707, 1725, a work which was to set the style for many later and historic accounts of natural history exploration.

Making collections of curios, or cabinets as they were termed, was fashionable in 17th century England. The importance of such collections as instruments of scientific knowledge was beginning to be appreciated. Sloane was fortunate to acquire great wealth, much of which he devoted to purchasing works of art, books, manuscripts, and curios of all kinds, and through his association with the Royal Society, for the promotion of scientific research.

The Sloane Herbarium, which is in the Department of Botany, British Museum (Natural History), London, contains the results of some of the earliest botanical investigation in China, Asia, and the New World. Such collections as those of James Cuninghame in China; Kamel in the Philippines; Banister, Bartram, Catesby, Houstoun, Krieg, and Vernon from America; Hermann and Oldenland from the Cape of Good Hope; and Kaempfer from Japan. From Europe there are plants from the Salvadors, Tournefort and Vaillant. From Great Britain there are specimens from Joseph Andrews, John Blackstone, Jacob Bobart, Samuel Brewer, Adam Buddle, William Courten, Samuel Dale, Johann Jakob Dillenius, Matthew Dodsworth, Samuel Doody, Edward Lhwyd, Christopher Merrett, James Petiver, Robert Plot, Leonard Plukenet, Charles Preston, Isaac Rand, John Ray, Richard Richardson, John Scampton, James and William Sherard, Lewis Stevens, William Stonestreet, James Sutherland, William Vernon, Thomas Willisel and Sloane himself.

The 337 *horti sicci* contain about 120,000 specimens, and are mounted in 265 mostly large folio volumes. Their serial number appears in Sloane's hand in most of the volumes. Many of them contain plants from several collectors and localities. There is often more than one specimen to a page. Dr. Matthew Maty, Librarian to The British Museum in 1757, wrote an inscription on many of the *horti sicci,* taking the title from Sir Hans Sloane's manuscript catalogue, now unfortunately missing. These *horti sicci* contain a large number of Linnean types. Much research is still necessary before a complete list of these can be made, though they are mostly to be found in the collections of Sloane himself, Catesby, Kaempfer, Petiver and Plukenet. Other important collections are those of Courten, Merrett, Kiggelaer, Boerhaave, Bartram, Duchess of Beaufort, Uvedale, Philip Miller and Buddle.

These herbaria show the various methods adopted in book herbals and provide an authentic record of how botanists of the 17th and 18th centuries preserved their plant collections.

This was a period when botanists began to feel the urgent need of a convenient way to classify the ever-growing number of plant species. At this time there were two methods of classification in use in Britain, that of Morison, and that of Ray, the latter being more frequently followed. Ray's scheme is set out in his *Methodus Plantarum Nova,* 1682, and was used in his famous enumeration of the plant world, *Historia Plantarum generalis,* 1686, 1704, in which he listed 18,600 species. A copy of the large-paper issue of this work was used by Sloane as an index to his collection. Unfortunately, it could only serve as a partial index. Plants not mentioned by Ray were added in manuscript, first by Sloane himself, later by his curators, Dr. Johann Amman, James Empson and John Hawkins.

The herbarium of Robert Uvedale (1642-1722) is arranged according to Ray. Uvedale's garden at Enfield was famous for its exotic plants. This collection is of special interest as it was the one consulted by Ray while compiling his 'Historia'. The specimens of crocus (Vol. 312, fol. 1270-1276) are mentioned by Maw in *A Monograph of the genus Crocus,* 1886, and are probably the earliest evidence of their cultivation in England. This volume also contains a fine series of British and North American orchids (fol. 1298-1316).

The Rev. Adam Buddle (b. *c.* 1660, d. 1715) was an outstanding British botanist of this period, and the plants in his collection (Vols. 114-126) are in systematic order. According to Trimen and Dyer (*Flora of Middlesex,* 1869) his herbarium is 'undoubtedly the most trustworthy and accurately named . . . . of the period which exists'. Dillenius used Buddle's herbarium and included many of his species in the third edition of Ray's *Synopsis methodica stirpium britannicarum,* 1724. This herbarium is thus of great value when determining the plants of the 'Synopsis'. Adam Buddle was the author of an unpublished work on the British flora, which forms a catalogue of his collection. It is entitled 'Methodus nova stirpium Britannicarum ex methodis et Raij et Tournefortij longe optimis collatis correcta cum nominibus et synonymis autorum maxime celebrium additis', and is among the Sloane MSS. (2970-2979) at the British Museum, Bloomsbury.

A botanist whose work was held in high esteem by Linnaeus was Leonard Plukenet (1642-1706), Superintendent of the gardens at Hampton Court and styled 'Queen's botanist'. Where the specimens in his herbarium are arranged in a sequence, it is alphabetically by name. Many of the specimens in one sequence (Vols. 95-98) were figured by him in his famous 'Phytographia', 1691-1692. This was the most extensive collection of plant figures yet published and was frequently quoted by other authors. The original drawings are in the Department of Botany, British Museum (Natural History). Linnaeus established many new species on these figures and text, not having seen the plants themselves. A list of these has been published, *Index Linnaeanus L. plukenetii,* by P. D. Giseke, 1779. The Department of Botany, British Museum (Natural History) has Plukenet's personal copy of the 'Phytographia', which is annotated by him. Another copy, annotated by Robert Brown, serves as a very important and practical index to the Plukenet *horti sicci.*

The Garden of the Apothecaries' Company at Chelsea, better known as the Chelsea Physic Garden, was celebrated throughout Europe at this period. Sloane who, since 1712, owned the Manor of Chelsea gave the garden to the Society of Apothecaries on certain conditions, one of which entailed 'the rendering yearly to the President, Council and Fellows of the Royal Society, fifty specimens of distinct plants, well dried and preserved, which grew in the garden the same year, with their names or reputed names; and those presented in each year to be specifically different from every former year until the number of two thousand shall have been delivered' (Field, H., *Memoirs of the Botanick Garden at Chelsea,* 1820, 30). The plants so presented were listed annually in the *Philosophical Transactions* from 1723-1774, and numbered 1-2550. These specimens were transferred to the British Museum in 1781. A MS. list in the Department of Botany extends this catalogue to item 3150. The eminence of the garden was largely due to Philip Miller, its Superintendent from 1722-1770. Many of the excellent descriptions in his famous *Gardeners' Dictionary* were drawn up from specimens grown in the garden. The most important edition of this work is the eighth, published in 1768, in which Miller adopted Linnaeus' binomial nomenclature for the first time. Many of these plants were illustrated in his *Figures of the most beautiful, useful and uncommon plants,* published from 1755-1760. The Sloane Herbarium contains an extensive collection of Chelsea plants prepared and named by Miller himself. These, and those of his personal herbarium, purchased by Sir Joseph Banks in 1774, are essential when determining his species.

Another important herbarium is that of James Petiver (1658-1718), a wealthy apothecary. Sloane, in his introduction to Volume 2 of his 'Natural History of Jamaica', says 'he had taken great pains to gather together the productions of nature in England, and by his correspondents and acquaintence all over the world procured, I believe, a greater quantity than any man before him'. *Museum Petiverianum a Jacobo Petiver, F.R.S.,* published 1695-1703, is Petiver's own description of many of the items in his collection. Petiver, in an announcement of the publication of the first part of this list, printed in the *Philosophical Transactions* for 1696, pp. 393-400, entreats all 'who travel into foreign countries will be pleased to make collections for me of whatever plants, shells, insects, etc., they shall meet with, preserving them according to directions that I have made so easie as the meanest capacity is able to perform'. The specimens mounted in 106 volumes are to some extent geographically arranged. The volumes which contain British plants are numbered 150-152, 'Hortus siccus Anglicanus methodo Rai dispositus à Dno Petiver'. Many of the specimens are carefully labelled in Petiver's hand, often with notes or with labels from Petiver's 'Botanicum Anglicum', 'Hortus Siccus Pharmaceuticus' (see below) and other publications, together with MS. labels by Buddle, Doody, Richardson, Jacob Bobart and other contemporaries. Some of the plants are localised, including many Middlesex specimens of Petiver's own collecting. Volume 202, 'Hortus siccus Pharmaceuticus', contains 'a curious collection of real plants, being the true patterns of such trees, shrubs, herbs native and foreign, as are most frequently prescribed by the Learned College of Physicians'. Volume 203, 'Botanicum Anglicum or the English Herbal, wherein is contained a curious collection of real plants being the true patterns of such trees, shrubs, and herbs, as are observed to grow wild in England . . . . with an account of their names, places where growing and times of flourishing'.

Some of the volumes in the Sloane collection contain specimens of garden plants and are of little botanical value, though some rare plants may be found among them. It was in the gardens and greenhouses of the wealthy patrons of horticulture at this period that many new plants were raised from seed and flowered for the first time in this country. Mention has already been made of Uvedale's garden at Enfield, and there were also the important gardens of the Duchess of Beaufort at Badminton and Chelsea, cited by William Aiton in his famous *Hortus Kewensis,* 1789. The Sloane herbaria record this immense interest that was shown in the cultivation of new and rare plants. Volume 64, for instance, is a record of tulip growing, 1658-1666.

William Sherard (1659-1728), founder of the chair of Botany at Oxford, bequeathed his herbarium to the University of Oxford. This herbarium was perhaps, 'except for that of Linnaeus, the most ample, authentic and valuable botanical record in the world', to quote Smith in Rees' *Cyclopœdia,* Vol. **32**. Uvedale's herbarium (Vols. 302-315) contains many British plants with labels written in Sherard's hand, among them some collected for the first time in Britain. He was especially interested in mosses and lichens.

Samuel Doody (1656-1706), a London apothecary and for a time Curator of Chelsea Physic Garden, was Britain's leading bryologist. The mosses in his herbarium (Vol 285, fol. 10-49, and Vol. 286, fol. 20. 22-30) with labels by himself, Buddle and Richardson are mostly British, and were no doubt the basis for the small treatise (Sloane MS. 2315, at the British Museum, Bloomsbury) which he intended to publish. This is merely a list of mosses and lichens, with synonymy and sometimes descriptions.

Sloane Volume 33/34 bears the inscription 'Plants gathered and put in order by Dr. Merrett . . . . The specimens are very good, with the seeds; and some of them scarce plants, especially from the northern parts of Britain'. These plants are probably those represented by Christopher Merrett (1614-1695), Librarian to the College of Physicians, in his *Pinax rerum naturalium Britannicarum*, 1666. Smith (*Transactions of the Linnean Society,* **4**, 277) says that Dr. Merrett in his 'Pinax' must be considered as the father of our indigenous botany'.

'Herbarium siccum Jo. Banister' (Vol. 168) contains plants gathered by the Rev. John Banister (1654-1692) in the garden of Oxford and in the fields around the town. It also contains the plants mentioned in the Anonymous 'Catalogus of Oxford', and in Dr. Plot's *Natural History of Oxfordshire,* 1677. Dr. Robert Plot's own set of Oxfordshire plants is contained in Vol. 113, fol. 1-186: 'A collection of dry'd plants nam'd by Mr. Jacob Bobart, of Oxford, gathered by Dr. Robert Plot . . . .'

Collections of some of the other botanists of Sloane's time are contained in the following volumes: Vol. 61, 'Plants gathered in Scotland by Dr. Preston', would appear to refer to Charles Preston, Professor of Botany in the College of Edinburgh and Intendent of the Physic Garden from 1706-1711 (*Notes from the Royal Botanic Garden, Edinburgh,* **19**, 64-102, 1935); Vol. 72, 'Plants gathered in England by Mr. Vernon (1688-1711), Dr. Richardson (1663-1741) and Mr. Bonivert (fl. 1673-1703); Vol. 231, 'Plants gathered in Wales and several parts of England (in the summer of 1726) by Mr. Dillenius (1684-1749) and Mr. Brewer (1670-1743). These represent the plants collected during a journey into Wales, described by Dillenius in his diary of the journey, preserved in the Library of the Department of Botany, University of Oxford. Most of them are characteristic Welsh species, some with labels in Dillenius' hand. Engravings of some of these species were made by Dillenius, of which copies are among a collection of drawings in the Department of Botany, British Museum (Natural History).

There is much more of importance to British botany in the Sloane herbaria, and those interested should consult the recently published catalogue, *The Sloane Herbarium: an annotated List of the Horti Sicci composing it; with biographical accounts of the principal contributors. Based on records compiled by the late James Britten,* revised and edited by J. E. Dandy, and published by the Trustees of the British Museum, 1958.

SOME ADDITIONS TO THE "FLORA OF SUSSEX"

By D. Philcox

The following notes relate especially to the writer's botanising in East and West Sussex, mainly on or near the coast and particularly in the neighbourhoods of Brighton and Shoreham. It must be emphasised that these notes do not constitute a complete list of all his records for Sussex made over the last few years, but simply a selection of those made by him between 1951 and 1957 and thought worthy of mention.

The records are arranged under the appropriate vice-counties, i.e. "13, W. Sussex", and "14, E. Sussex", and the numbers between 1 and 6 preceding the records, refer to the botanical divisions as defined in the *Flora of Sussex* (A. H. Wolley-Dod, 1937). The districts are in serial order under each vice-county.

In the following list, plants not mentioned in the *Flora of Sussex* are marked with an asterisk, and those which are not native to the vice-county with a dagger.

All the records are the findings of the writer except where otherwise stated.

LIST OF VASCULAR PLANTS

The nomenclature and order is that of the *List of British Vascular Plants*, by J. E. Dandy (1958).

38/1 Helleborus foetidus L. 13, W. Sussex. 2. Angmering Park, 1955.

46/11 Ranunculus lingua L. 14, E. Sussex. 4. Peacehaven Pond, a large colony, 1955.

58/4 Papaver hybridum L. 13, W. Sussex. 3. Shoreham Beach, waste ground, 1955.

58/5 P. argemone L. 13, W. Sussex. 3. Shoreham Beach, on shingle, 1956. 14, E. Sussex. 3. Frequent on Corporation rubbish-tip, Sheepcote Valley, Brighton.

†58/6 P. somniferum L. 13, W. Sussex. 1, Waste ground, Amberley Wild Brooks, 1957. 3. Shoreham Beach on shingle, 1957. 14, E. Sussex. 3. Edge of cornfield, Stanmer Park, 1956.

67/1 Brassica oleracea L. 13, W. Sussex. 3. Single plant, Shoreham Beach, 1955.

*†76/1 Rapistrum perenne (L.) All. 13, W. Sussex. 3. Shoreham, 1956.

*†76/2 R. rugosum (L.) All. 13, W. Sussex. 3. South side of Shor-eham Airport, 1956. Shoreham Beach, 1956.

77/1 Cakile maritima Scop. 13, W. Sussex. 1, West bank of River Arun, Littlehampton, now very scarce, 1956.

79/3 LEPIDIUM HETEROPHYLLUM Benth. 14, E. Sussex. 4. Few plants on downs west of Cuckmere Haven, 1955. Seaford Head, 1957.

†79/4 L. RUDERALE L. 13, W. Sussex. 1. Single plant, Aldwick Beach, 1956.

*†92/1 LOBULARIA MARITIMA (L.) Desv. 13, W. Sussex. 1. Aldwick Beach, 1956.

†98/4 BARBAREA VERNA (Mill.) Aschers. 13, W. Sussex. 3. Shoreham Beach, 1956.

†108/4 SISYMBRIUM ORIENTALE L. 13, W. Sussex. 3. Shoreham Beach, 1957.

133/3 STELLARIA PALLIDA (Dumort.) Piré. 14, E. Sussex 3 and 4. Cliff tops between Rottingdean and Black Rock, 1957.

133/6 S. PALUSTRIS Retz. 14, E. Sussex. 4. Chailey Common, 1956.

169/3 ERODIUM CICUTARIUM (L.) L'Hérit. 13, W. Sussex. 1. Pagham Beach, plentiful, 1956. Aldwick Beach, 1956.

189/2 ONONIS SPINOSA L. 13, W. Sussex. 3. Partridge Green, 1954.

†191/2 MELILOTUS OFFICINALIS (L.) Pall. 14, E. Sussex. 3. Pangdean, 1954.

†191/3 M. ALBA Medic. 13, W. Sussex. 2. One plant in pavement, Pier Road, Littlehampton, 1956. 3. Wharf and railway sidings, Kingston-on-Sea, 1951-1955.

192/11 TRIFOLIUM SCABRUM L. 13, W. Sussex. 1. Sand spit, West Wittering, 1957.

195/2 LOTUS TENUIS Waldst. & Kit. ex Willd. 14, E. Sussex. 4. Frequent on cliff tops, Peacehaven, 1955.

206/3 VICIA TENUISSIMA (Bieb.) Schinz & Thell. 14, E. Sussex. 5. Frequent in Mill Wood, 1954-1956.

206/12 V. LUTEA L. 13, W. Sussex. 1. Several plants on shingle, Pagham Beach, 1956, C. SCHELWALD.

207/1 LATHYRUS APHACA L. 13, W. Sussex. 3. Frequent both sides of footpath on east side of Hangleton Golf Course, 1956, C. SCHELWALD. Garden weed, Brighton, 1955, E. A. D. WHITE. Shoreham Beach, 1957.

212/2 POTENTILLA PALUSTRIS (L.) Scop. 14, E. Sussex. 5, Banks of River Cuckmere at Chilver Bridge, 1951.

†235/11 SEDUM REFLEXUM L. 13, W. Sussex. 3. Well established on waste land, Findon, 1955.

†256/2 OENOTHERA ERYTHROSEPALA Borbás. 13, W. Sussex. 2. Sandy field north of Amberley Wild Brooks, 1956.

*†256/4 O. PARVIFLORA L. 14, E. Sussex. 3. Casual on railway banks between London Road and Lewes Road (disused) Railway Stations, Brighton, 1956.

282/1 CONIUM MACULATUM L. 14, E. Sussex. 3. Roadside southwest of Hollingbury Golf Links, Brighton, 1957.

298/1 Crithmum maritimum L. 14, E. Sussex. 3. Several large colonies on cliff face between Black Rock, Brighton and Rottingdean, 1956.

300/6 Oenanthe aquatica (L.) Poir. 14, E. Sussex. 4. Barcombe Mills, 1956.

302/1 Foeniculum vulgare Mill. 13, W. Sussex. 1. An occasional plant between Pagham and Aldwick, 1956.

386/1 Menyanthes trifoliata L. 14, E. Sussex. 3. Pond adjoining Stanmer Village Church, 1956.

410/1 Atropa bella-donna L. 13, W. Sussex. 2. Angmering Park, 1955.

421/1 Chaenorhinum minus (L.) Lange. 13, W. Sussex. 3. On waste ground, Shoreham Beach, 1956. Wolstonbury Hill, 1956. 14, E. Sussex. 3. Hollingbury Hill, 1951.

430/4 Veronica scutellata L. 13, W. Sussex. 3. About edge of pond formed from old bomb crater in grounds of Lancing College, 1956. 14, E. Sussex. 4. Peacehaven Pond, 1955.

430/6 V. montana L. 14, E. Sussex. 5. Nate Wood, 1951.

448/1 Thymus pulegioides L. 14, E. Sussex. 3. Abundant on cliff tops east from Black Rock, Brighton, 1956.

448/3 T. drucei Ronn. 13, W. Sussex. 3. Wolstonbury Hill, 1956. Waterhall, Brighton, 1956.

475/6 Campanula glomerata L. 13, W. Sussex. 3. Several plants by roadside between Steyning and Wiston, 1954.

478/2 Phyteuma spicatum L. 14, E. Sussex. 5. Mill Wood, common in one ride only, 1954-1956. West side of road from Milton Hyde to Caneheath, 1956.

485/11 Galium tricornutum Dandy. 13, W. Sussex. 3. Edge of cornfield, Waterhall, Brighton, 1956.

†489/1 Symphoricarpos rivularis Suksd. 13, W. Sussex. 3. Between Devil's Dyke and Truleigh Hill, 1954.

494/1 Valerianella locusta (L.) Betcke. 13, W. Sussex. 2. Clapham Wood, 1957.

†496/1 Centranthus ruber (L.) DC. 13, W. Sussex. 3. Well established as an escape on Shoreham Beach, 1955. 14, E. Sussex. 3. Now quite common on railway banks between Brighton and Lewes, 1956. Common on cliff tops east of Brighton, 1956.

514/1 Filago germanica (L.) L. 13, W. Sussex. 3. Hudson's Sand-pit, Hassocks, 1951-1956.

521/1 Erigeron acer L. 13, W. Sussex. 3. Very common on shingle, south side of chemical works, Shoreham Beach, 1953-1956. Hudson's Sand-pit, Hassocks, 1956. By roadside, Stone Pound crossroads, Hassocks, 1956. Railway banks, Pangdean, 1954.

†522/1 Conyza canadensis (L.) Cronq. 13, W. Sussex. 1. West Wittering, 1956. 2. Sandy ground north of Amberley Wild Brooks, 1956. Pulborough, 1956. Amberley, 1956. 3. Shoreham Beach, 1955. 14, E. Sussex. 3. Common in and around Brighton and very common in the vicinity of the Corporation rubbish-tip at Sheepcote Valley, Brighton, 1955.

†526/1 Anthemis tinctoria L. 14, E. Sussex. 3. Cornfield north of Brighton, 1951.

544/3 Centaurea cyanus L. 14, E. Sussex. 3. Cornfield north of Brighton, 1951.

†552/2 Tragopogon porrifolius L. 13, W. Sussex. 3. Garden weed, Hove, 1957.

559/5 Crepis biennis L. 13, W. Sussex. 3. Old Shoreham, 1956.

*563/2 Alisma lanceolatum With. 14, E. Sussex. 4. Peacehaven Pond, 1955.

565/1 Sagittaria sagittifolia L. 13, W. Sussex. 3. Wiston Lake, 1954.

592/1 Ruscus aculeatus L. 13, W. Sussex. 1. South Wood, Arundel Park, 1952-1956. 14, E. Sussex. 5. About Pevensey Castle, 1954.

606/3 Luzula sylvatica (Huds.) Gaudin. 14, E. Sussex. 3. Ditchling Common, 1957.

627/1 Spiranthus spiralis (L.) Chevall. 13, W. Sussex. 3. Sixteen plants between Patcham water-works and railway, 1956.

638/1 Platanthera chlorantha (Custer) Reichb. 13, W. Sussex. 3. Large colony on N.W. slopes of Wolstonbury Hill, 1956, Miss U. K. Smith.

638/2 P. bifolia (L.) Rich. 13, W. Sussex. 3. West of old London Road, towards Wolstonbury Hill, 1955.

644/1 Aceras anthropophorum (L.) Ait. f. 13, W. Sussex. 3. Small colony on Wolstonbury Hill, 1956.

686/1 Elymus arenarius L. 13, W. Sussex. 1. Spit and East Head, West Wittering, 1956. West Wittering Beach, 1956.

687/3 Hordeum marinum Huds. 13, W. Sussex. 1. Clymping Sands, 1956.

NATURAL REGENERATION IN JUNIPER

By H. Vedel
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In *Proceedings B.S.B.I.,* Vol. 3, p. 474 (1960), members of the Society were asked to assist in studies of *Juniperus communis* in the south-eastern parts of England, as the Nature Conservancy had expressed concern at the failure of the species to regenerate.

At the Department of Botanical Taxonomy and Forest Botany of the Royal Veterinary and Agricultural College of Copenhagen this problem has been studied for some years, and as a member of the staff I give below a brief survey of some of the results hitherto achieved concerning the biology and ecology of *Juniperus communis.*

The investigations were started in a conserved area of juniper scrub situated in North Sealand. This stand was in danger partly owing to a considerable invasion of deciduous trees and conifers, and partly because regeneration did not take place.

A study of the history of this juniper scrub as well as investigations into other juniper stands shows that the fate of juniper communities is dependent on man's use of the areas, especially as pasture land, as well as on edaphic conditions.

The following survey is intended to assist in the elucidation of these problems by giving brief explanations and descriptions of areas in which seedlings and very young individuals of juniper have been found:

- 1) in grazed areas
  - grazed by domestic animals
    - commons with heather dominating *a.*
    - commons with grass dominating *b.*
  - grazed by deer
    - grassy area in woodland *c.*
    - under trees on *Calluna*-heaths *d.*
- 2) in ungrazed areas
  - poor sandy soil *e.*
  - abandoned fields on light soil *f.*
  - windbreaks in inland dunes *g.*
  - banks along newly made roads *h.*
  - south-exposed sheet of rock with sparse vegetation *i.*
  - under cut-down individuals of female junipers *j.*

a. In areas comparatively little grazed by cattle and horses, covered with dominant *Calluna* together with several other heath components. Rather often seen in Denmark.

b. In areas with more heavy grazing, covered with degenerate *Calluna* heath. Very rich in "grasses" (*Agrostis tenuis, Deschampsia flexuosa* and *Luzula campestris*). Several places especially in Jutland.

c. One example: an old beech forest with a small area of grassland often grazed by deer. In the grassland stand two old beech trees, under which were found about 10 junipers from 1-10 years old. The distance to the nearest juniper scrub is about 3 miles.—Sweden (Bjerke, unpublished).

d. Under scattered trees in compact *Calluna* heaths, the vegetation changes from *Calluna* to grasses and sedge. These areas are sought by roaming deer. Rather often found in Sweden and Denmark.

e. On poor sandy soil with *Polytrichum juniperinum, Cornicularia aculeata* and *Cladonia* spp. Moreover *Carex arenaria, Corynephorus canescens* and *Empetrum* occur. The vegetation does not cover the ground.—The Isle of Anholt.

f. In Tibirke Hills in North Sealand a field of potatoes, abandoned in 1928, has grown into juniper scrub and *Calluna* heath. The area has not been grazed, at least not by domestic animals.

g. Böcher (1941) points out that in the inland dunes of Hovborg Sande (Jutland) juniper is especially common in the windbreaks.

h. On banks along newly-made roads on sheets of mineral soil where other vegetation is sparse.—Several places in the Isle of Bornholm.

i. On south-exposed slope with rock beneath. Vegetation sparse, characterised by *Helictotrichon pratense, Poa compressa, Festuca ovina,* and *Cladonia* spp.—The Isle of Bornholm.

j. In *Calluna* heath with many juniper shrubs, several juniper seedlings were found at a place where, three years before, a low and broad female juniper had been cut down. The vegetation on this spot is dominated by *Carex arenaria* and *Deschampsia flexuosa.*

The occurrence of patches devoid of vegetation is common in the grazed as well as in the ungrazed areas (groups 1 and 2). This is self-evident as regards the ungrazed areas mentioned above, and it is also well-known that grazed areas are much worn by the activities of cattle.

Whereas the natural regeneration in juniper in very different areas—which, however, all offer the germination of juniper seed good conditions—has been briefly accounted for above, results of some newly-begun studies concerning the seed dispersal cannot as yet be given. However, German and American observers point out that juniper seed is dispersed by thrushes and crows—I believe that gallinaceous birds are of importance too—and by hares and sheep.

American authors specially emphasize the importance of sheep to the seed dispersal of juniper. Miller (1921) gives a very convincing account of how *Juniperus utahensis,* in 25 years, has spread over 10,000-15,000 acres in Arizona due to the activities of sheep.

I consider it highly probable that the cause of the very large and uniform juniper scrubs in Scandinavia, especially in Sweden, is to be found in effective seed dispersal combined with optimal conditions of germination, which are both the result of grazing by domestic animals (especially sheep) and of fluctuations in the intensity of grazing, seeing that the young juniper plants in the first years of their lives will not stand grazing.

Further investigations and observations, made after the above notes were written, indicate that the growth of the young junipers mentioned in the groups *c.* and *d.* is due to an interaction between different birds and the grazing animals, in that the birds when perched in trees drop the juniper seed to the ground, which is optimally prepared for germination by the grazing animals.

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THE OXLIP IN HERTFORDSHIRE

By John G. Dony

Oxlips were recorded by early Hertfordshire botanists but from stations which leave no doubt that they were hybrids of primrose and cowslip and not the "true" or "Bardfield oxlip" (*Primula elatior* (L.) Hill). Webb and Coleman (1849) wrote, "what the plant of our correspondents may be, we know not, not having received specimens; but we fear our own is nothing but an umbellate form of *P. vulgaris*". Pryor (1887) notes the oxlip in Cambridgeshire, Essex and Bedfordshire; but it was not known definitely in the last-named county until 1934. The first valid record of the species for Hertfordshire is by Miller Christy (1897) who gives the western "boundary-line" of oxlip in its larger "Eastern area" in Essex and Suffolk to pass "through Newport, Quendon, Rickling and Farnham to Stanstead Montfitchet. All these places are in Essex: but between the two last-named, a very small projecting portion of Hertfordshire is included". In 1922 he referred to the species "extending . . . . to a minute degree in Hertfordshire". Maps illustrating both of Miller Christy's papers show the distribution of the oxlip in Hertfordshire to be a very small area of less than one square mile about a mile north of Bishop's Stortford. It is probably on the authority of Miller Christy that *Primula elatior* is listed for v.c. 20, Hertford, in *Comital Flora*. I have been unable to find further evidence in print or as a herbarium specimen to support the record*. The small area indicated contains little woodland and close search of this and neighbouring woods has failed to reveal any plants. A. W. Graveson who knew Hertfordshire well, noted it a quarter of a mile from the county boundary but not in the county itself.

Early in 1960 Mrs. B. H. S. Russell organised a meeting for members of the Wild Flower Society to visit Quendon Wood in Essex to see oxlips, and the various hybrids with primrose and cowslip, and invited me to be a joint leader. We planned that after the visit to Quendon Wood we would proceed to Beeches Wood at Brent Pelham in Hertfordshire in the hope of finding further oxlips there. In giving us permission to visit this wood, Major M. Barclay, of Brent Pelham Hall, suggested that, while we might be fortunate enough to find oxlips in Beeches Wood, they could be seen more plentifully in Great Hormead Park Wood. On 14th April, 1960, Major Barclay and Miss J. Hoare took Dr. and Mrs. L. Lloyd-Evans, Mrs. Russell and me to this wood where we were shown *Primula elatior,* with many hybrid forms with *P. vulgaris,* scattered along the whole of the eastern side of the wood and penetrating to a depth of about fifty yards. The colony is in every respect similar to that in Potton Wood in Bedfordshire where oxlips grow on the margin of the "Western area" of the plant in Cambridgeshire and Huntingdonshire. Mrs. Barclay, who has taken a special interest in so delightful a plant growing so near her home, has known it in Great Hormead Park Wood for about 40 years and Miss Hoare, who has visited it each year for the past ten years and knows the "true oxlip" well, assured us that it also grows, but very sparingly, in Beeches Wood. On the day of the Wild Flower Society meeting we searched Beeches Wood thoroughly but were unable to find any true oxlips.

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*Mr. B. T. Ward has also been unable to find a Hertfordshire specimen in the Miller Christy Collection at Stratford Museum.

Great Hormead Park Wood is six miles north-west of the small area indicated by Miller Christy and five miles west of the boundary-line he drew for the plant in Essex. Beeches Wood is three miles west of his boundary line. The intervening country is separated in each case by the valley of the River Stort and the Boulder Clay overlain by or broken into by river gravels. The new Hertfordshire colonies may consequently be regarded as an extension much further westwards of the "Eastern area" of the species. Miller Christy recognised a number of "outliers" on the north-eastern fringe of his "Eastern area" where the oxlip appears in boggy meadows bordering the streams draining the Boulder Clay. The habitat in the Hertfordshire woods is in no respect different from that in the Essex woods and the colonies here cannot be considered to be "outliers" of the species in the sense that Miller Christy used the term.

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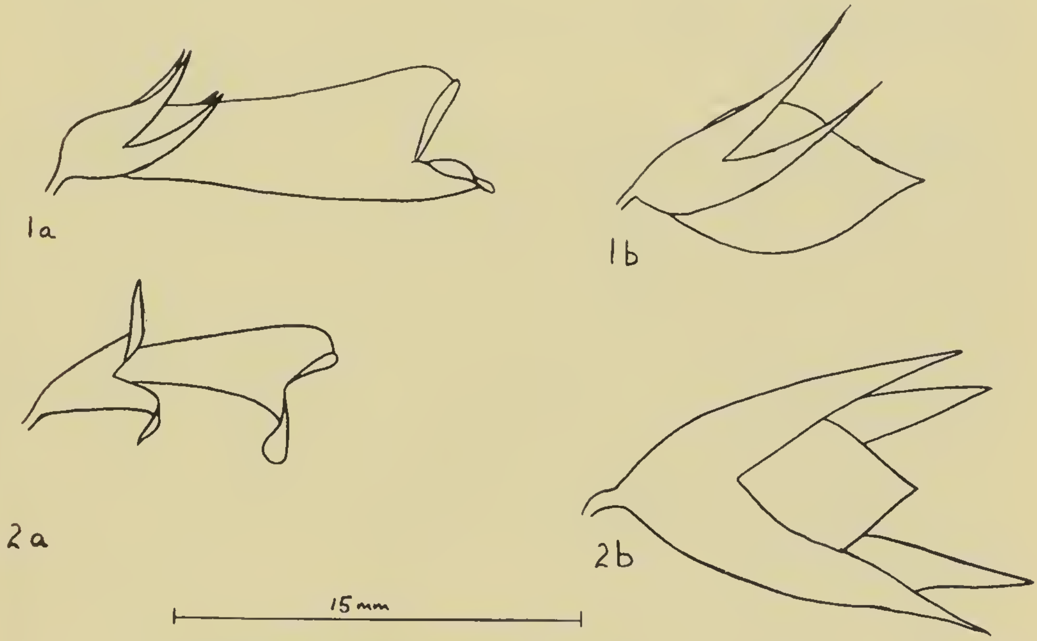
A NOTE ON THE DIFFERENCES BETWEEN MELAMPYRUM PRATENSE L. AND M. SYLVATICUM L.

By A. J. E. Smith
(Botany School, Oxford)

There has been considerable confusion in Britain and on the Continent between the two species of cow-wheat, *Melampyrum pratense* and *M. sylvaticum.* The former species is very variable morphologically and certain forms bear a close superficial resemblance to *M. sylvaticum* and have frequently been named as such. The main differences between the two species are tabulated below and flower and calyx differences are illustrated in the accompanying figure.



Melampyrum pratense: 1a, flower; 1b, fruit.
Melampyrum sylvaticum: 2a, flower; 2b, fruit.

Melampyrum pratense L.	Melampyrum sylvaticum L.
Upper bracts (second to fourth pair onwards) of the inflorescence toothed except in some small plants with only two to three pairs of bracts.	Upper bracts entire except in some large plants (usually 20 cms. or more in height) where there may be one or two pairs of small teeth on the uppermost bracts.
Calyx lobes appressed to corolla.	Calyx lobes spreading.

Lower lip of corolla not deflexed.	Lower lip of corolla deflexed.
Fruit containing four seeds, dehiscing by a dorsal suture.	Fruit containing only two seeds, dehiscing by a dorsal and a ventral suture.

In Britain, *Melampyrum sylvaticum* does not occur south of North-West Yorkshire (v.c. 65), and the only vice-counties from which I have seen specimens are 65, 66, 83, 88, 89, 90, 91, 92, 96, 97, 98, 106, and H39.

SOME NOTES ON SEED DISPERSAL

By H. E. Green

In recent additions to the "Biological Flora" there have appeared statements that appear to me both surprising and rather disappointing. The only explanation I can suggest is that a reaction from the old idea that everything in nature was perfect is leading to a conception that would appear to indicate there was neither order nor reason in nature.

In the article dealing with *Hornungia petraea* appears the following:—

> "Dispersal is inefficient; seedlings are rarely found more than a few inches from the position of the parent plant, although in certain localities where steep slopes are exposed to strong westerly winds, there is evidence that wind dispersal is effective. Although the seeds are mucilaginous they have never been observed to stick together or to the parts of the siliculae."

If dispersal is inefficient one may reasonably ask how then is the plant able to survive? It is a species that requires conditions which are not very common in most areas. There must, for instance, be lime and a shallow soil or other conditions that prevent strong-growing species from competing, for they would smother it. It therefore follows that wind dispersal could only help to a very limited extent. If mucilage caused the seeds to stick together the dispersal of the seeds in this instance would certainly not be helped. There are instances where this occurs, as for example *Juncus tenuis,* where the way in which the capsule opens actually allows moisture to enter, but that plant grows on wet ground, especially by paths and places where animals walk so that the fruits will actually be walked on when wet and the seeds disturbed.

Can we not recognise how mucilage acts under varying conditions; thus on salt marshes we find species producing a heavy discharge of mucilage, so that the seeds will be firmly cemented to the feet or legs of birds rising from the ground. The result of this is that they will remain secure until ground as wet as that from which they came is encountered. An intermediate stage is encountered with pasture plants such as *Bellis perennis* and *Prunella vulgaris,* where a fairly moist condition is common, and finally we find in cases such as the present, where there is a dry habitat, a very light discharge is sufficient to hold the light seed to the bird until it alights when a slight knock will release it. Were there a heavy discharge the seed would remain attached until moist ground was reached where the plant would of course be unable to grow.

That the seed does not adhere to any part of the capsule is surely because it is protected from moisture while inside and that the capsule only opens in dry weather.

The article on *Cynosurus cristatus* states that the grains are "Dispersed chiefly by wind". The grain in that species is relatively heavy and has no loose glumes to serve as wings but, when mature, it breaks loose and can be seen resting on the barren glumes which appear like a comb. Any body brushing past and shaking the stem will cause it, when springing back, to throw the grain and this, with the help of the small awn, would readily adhere to the coat of, say, an animal.

By the simple attribution of all dispersal to wind we miss the beauty of the mechanism that causes the grain to be held ready to be thrown. If we accept the idea of Natural Selection and imagine thousands of species having been eliminated in the struggle, it should surely cause no surprise to find a close adaptation of existing plants to their environments.

Wind dispersal alone is surely far less effective than is usually supposed, for even in the case of *Poa annua*, with a light grain and spreading glumes, where wind dispersal looks obvious, there is evidence that it would not produce the results we see. Wild birds kept in aviaries are found to be extremely fond of the grains, though they seem so small, and we can see that when alighting on a tuft, especially under damp conditions, some of the grains will adhere to the birds. Thus, when we see this species spring up so readily between cracks in city pavements, is it not more reasonable to think that they have been brought by sparrows than by wind, though when on pavements wind may blow them to edges where there is soil.

Looking back over some earlier articles I find the same restriction of ideas on dispersal of seeds to wind, as for instance in the case of *Carex flacca,* though the fruit is admitted to be heavy, without wings and so not carried far. Again one can only ask how does it then get moved? The utricles are said to be buoyant and will float for 2½-3 weeks.

Taking this in conjunction with the statement that it grows in open situations and, when in woodlands, usually in open parts in clearings and rides, may we not assume that rainwash will play a part. This carries with it the chance that the fruit will be lifted with mud on the feet of birds or animals while in marshy areas the fruits will float on pools until these become dry or the fruits are blown to the edge, when again they are on wet mud and liable to be lifted.

As in some instances, where for example two distinct forms of seeds or fruits are formed, it is clear that two means of dispersal contribute there are grounds for thinking that in most instances more than one method of dispersal takes place.

THE BOTANICAL SOCIETY'S REGIONAL STRUCTURE

By D. E. Allen

At the Annual General Meeting in April, 1960, members gave their assent—with a remarkable absence of queries or discussion—to a number of changes in the Rules, which, when duly carried out, are expected to bring about a radical alteration in the Society's structure. These changes are important enough in themselves to justify a paper explaining them in greater detail, and at the same time this provides an opportunity of putting on record in a more permanent form than would otherwise be likely some of the background to various recent developments in the Society's activities. For reasons which will become plain these have centred on the Society's long-established system of Local Officers, and accordingly the most useful way of beginning will be to trace in outline the origin and growth of this insufficiently known side of its work.

The practice for national scientific societies to have local representatives, though largely a twentieth-century development, is very much older than is generally realised. Our own ancestor, the Botanical Society of London, is known to have had no fewer than 25 Local Secretaries as early as 1838 and in fact appears to have been the pioneer in this form of organisation. Its success can doubtless be gauged from the fact that the Palaeontographical Society had instituted a similar system by the late 1840's, which in turn was subsequently copied by the Geologists' Association in 1859. One of the main purposes of these Local Secretaries was to recruit new members in areas which were largely out of touch with London, but to some extent also they seem to have acted as a new kind of record-collecting machinery—the precursor of what, after enormous increases in scope and refinement, has grown to become the 'network research' of present-day natural history.

With the demise of the Botanical Society of London in 1857, the Local Secretary system, too, seems to have come to an end. For many years after this membership, in any case, remained too small to justify anything so ambitious. But with the great build-up that took place between the wars under the Secretaryship of Dr. G. C. Druce the idea seems to have returned almost as a matter of course. In the Report of the Botanical Exchange Club for 1932 (p. 17) we find Druce's successor, W. H. Pearsall, urging that one of the most pressing requirements facing the Club was "to secure completeness and accuracy in our records of plant distribution and its periodic changes. For this purpose we need in every county a Local Secretary who will undertake the collection and verification of all plant records for the area, and to whom we can refer botanical enquiries as to their authenticity. The

Comital Flora could form the basis of such work, and we shall be pleased to hear from botanists willing to undertake this revision for a definite area". This suggestion bore fruit, and in the Report for the following year a list of eight Local Secretaries duly appeared, one of whom, Miss C. M. Rob, has continued to act in that capacity for North-West Yorkshire ever since. During the next five years the list was gradually expanded and by the outbreak of war a reasonable start had been made towards covering the whole country.

The war inevitably scattered members and in these and similar matters destroyed continuity, so that, when conditions returned to normal in 1945, one of the Society's first moves was to appoint a Development Committee to advise on any changes or extensions in the various services offered to members that might be thought desirable. This committee met for the first time in December of that year and Miss M. S. Campbell was appointed Secretary. At this meeting it was agreed that a questionnaire should be circulated to members, asking them for their views on all the Society's activities and including *inter alia* a reminder about the existence of Local Secretaries (whose duties by this time had evidently evolved to include assistance with excursions in their areas) and an appeal for volunteers for vice-counties without a representative. Fourteen vacancies were filled as a result.

In view of this support for the scheme it was decided that the time had come to regularise its functions, and a list of the suggested duties of the two types of Local Officer now recognised, namely Local Secretaries and Recorders, was therefore drafted and incorporated in the Rules. There were then (1947) 38 members acting for 68 vice-counties in either the one capacity or the other.

By 1952 the Society had begun to expand so fast that the Honorary General Secretary could no longer cope with the flood of non-critical material sent to him for naming, a duty which till then had survived from pre-war days as one of the miscellaneous ones attached to that office. To meet this emergency, the local organisation was now drastically extended by the addition of a Referee for each one of the 112 vice-counties of Great Britain, together with a superstructure of Regional Referees to whom material could be referred by the vice-county Referees in case of difficulty. The result, it was subsequently realised, was to overcomplicate the system, so that members—and even the Development Committee itself—had difficulty in understanding it and enabling it to function as intended.

At this point a whole series of new developments began to take place which were to alter thinking on this subject very substantially. Early in 1952 a group of Cambridge members had submitted to Council a number of suggestions (named for convenience the "Cambridge proposals") for improving and extending the work of the Society in various ways. These had three main results: firstly, the setting up of what is now the Junior Activities Committee; secondly—encouraged by the example of the Systematics Association—the holding of regional exhibition meetings, beginning with a most successful one at Manchester in the autumn of 1953; and, thirdly, the idea of regional committees. It is out of this last, which has had a rather complicated history, that the present changes have mainly originated.

In November 1952, Miss Campbell offered to arrange, as an experiment, a special meeting for Scottish Local Secretaries and Recorders; and in due course this took place at Perth, in June 1954. The enthusiasm this engendered among local members gave rise to the idea of a similar meeting at Glasgow in the following winter and at the same time to proposals for the setting up of a special Scottish Committee. These, the "Perth proposals", were reiterated and worked out in detail at the subsequent meeting (the "Glasgow proposals"), with the result that the Committee for the Study of the Scottish flora shortly afterwards came into being as an autonomous body under the joint aegis of the B.S.B.I. and the Botanical Society of Edinburgh. A further fruit of the "Perth proposals" was the decision to hold the Annual General Meeting once in every two or three years outside London.

By this time it was becoming more and more clear that the original local organisation was not functioning nearly as well as had been hoped and was, moreover, increasingly out of step with the new regional developments. Canvassing of Council opinion showed that the feeling was widely shared that something needed to be done, and accordingly, as Secretary of the Development Committee (in which office I had succeeded Mr. Milne-Redhead at the end of 1952), I produced a tentative scheme which, after receiving Council's blessing, formed the basis of discussions which altogether continued for two years. In October 1957 the main outlines of the new scheme were accepted by Council, and it was then left to the Committee to work out the final details and embody the necessary changes in a completely revised version of the Rules. This whole task has now, happily, at last been achieved.

Broadly speaking, three main changes have been made. Firstly, the office of Local Secretary has been abolished, as it was felt that the vice-county was in general too small an area to inspire local enthusiasm; and in its place a new office of District Secretary has been instituted, which will be concerned with several adjoining vice-counties grouped together in areas mainly corresponding with the old Watsonian Provinces (see Table 1). A special arrangement in this respect will naturally need to be made in the case of the Home Counties, as no less than a third of the Society's membership is—most untidily—crammed into this comparatively small portion of the country. For this area the previous system of organisation at the vice-county level will probably be maintained.

A list of the functions suggested for District Secretaries has already been published in *Proceedings,* **4**, 112-113 (1960). These are substantially the same as those previously recommended to Local Secretaries, but more emphasis has now been laid on the organising of local meetings.

The second change has been the abolition of Referees. This office was felt to be superfluous, as a large proportion of the work they were expected to receive has proved to devolve on Recorders. Recorders therefore remain as before, one for each vice-county in Great Britain, but their functions have been considerably extended to include the refereeing of non-critical material as well as the local organising of work for the Distribution Maps Scheme. It is felt that a Recorder will normally be someone who is preparing a county flora, if only in embryo, and the functions that have been allotted to the office are all of the kind that would normally come the way of someone in this position. Naturally, it is hoped that Recorders and District Secretaries will work closely together, as their functions are largely complementary.

The third change is much the most revolutionary. Council has for long been anxious that the B.S.B.I. should not come to be regarded as essentially a 'London' society. Inevitably, in view of the heavy concentration of the membership in the south-east of England and the high cost of travel for members of a body such as our own which cannot afford to reimburse such expenses, the Officers and committees tend to be recruited preponderantly from members who live within reasonably easy reach of the Metropolis. The south-east, I think it can truly be said, has long felt guilty about this situation, but remedying it is far from easy. As a move in the right direction, however, it has been decided gradually to alter the composition of Council by means of the appointment of Regional Council Members. The Society recognises seven Regions altogether, and it is intended that as each of these* in turn acts as host to the Annual General Meeting or holds a Regional Exhibition Meeting, so the members from the Region concerned present at these will, at a special meeting in the course of the day's proceedings, elect someone to represent them on Council. As this process gradually comes about over the next few years, so the number of Council members elected at the Annual General Meeting will be reduced in proportion. In this way it is hoped that the different Regions will begin to feel that they have a bigger voice in the Society's affairs, and that in due course Regional initiative will flourish to the extent of generating special committees on lines which the example of Scotland has already proved to be highly successful. Should this in fact come to pass, the Society will then have turned itself into a truly federal body—a tendency which Council feels is wholly desirable and, in any case, as the Society grows and evolves, probably structurally inevitable.

*Except Scotland and Ireland, which are special cases.

It hardly needs to be added that the success of all these changes necessarily depends on the amount of support they attract from each member individually. The last impression it is hoped to convey is that a blueprint has been drawn up and will now be imposed for better or for worse. All who have had a hand in preparing this new scheme are convinced that it can only succeed by being introduced piece by piece and by being pruned wherever necessary. It is intended to be not a strait-jacket, but a mould into which the Society can grow in the next few years to come.

I am indebted to Dr. J. G. Dony, Mr. D. H. Kent, Mr. J. E. Lousley and Mr. E. Milne-Redhead for reading through the manuscript of this paper and making many useful comments.

TABLE I.

Regions and Districts of the Society

together with details of their membership

Regions and Districts	*Vice-Counties*	*No. of Individual Members*		
		Total, Jan. 1960	*% change since April 1955*	*Members per 100,000 population*
I SOUTH-WEST				
A Peninsula	0-4	47	+74%	3·77
B Avon	5-8, 33, 34	61	−14%	3·12
C Channel	9-12	59	+51%	3·48
II SOUTH-EAST				
A Home Counties (South)	13-17	218	+26%	2·72
B Home Counties (North)	18-21, 30	139	− 1%	
C Thames	22-24	66	+35%	5·44
D Anglia	25-29, 31	60	+46%	4·37
III MIDLANDS				
A Severn	36-40	45	+10%	0·98
B Trent	32, 53-57	49	+36%	1·36
IV WALES				
A South Wales	35, 41-46	24	+50%	1·17
B North Wales	47-52	20	+18%	3·49
V NORTH				
A Mersey	58-60, 71	50	+ 9%	0·79
B Yorkshire	61-65	49	+40%	1·05
C Tyne	66-68	23	+35%	2·06
D Lakes	69, 70	13	−13%	2·82
VI SCOTLAND	72-112	87	+53%	1·68
VII IRELAND	H1-40	20	+11%	0·47
	Total:	1,030	+24%	2·42

PLANT NOTES

322/1. Koenigia islandica L. In June 1960 my wife and I visited the colonies of *Koenigia islandica* on Beinn Storr and found the young seedlings growing plentifully. When we visited the area again after two heat waves, there was scarcely a plant to be seen.

Most of the damp areas of spring water had dried, and it was evident that many sheep had been crowding there. It would be interesting to know if sheep eat *Koenigia*; I suspect that they do. Even if they do not, the trampling of their feet would kill, or bruise, the small tender plants. In places the *Koenigia* colonies have been literally wiped out.

It will be interesting to see the effect of this on the *Koenigia* colonies this year.—Seton Gordon.

506/1. Senecio jacobaea var. stenoglossus Brenan & Simpson, 1949, *Proc. Roy. Irish Acad.*, **52**B, 69. This variety would appear to be still unfamiliar to most British botanists and deserves closer study than it has so far received, particularly from a genetical point of view.

It was originally described from the north of Ireland on the basis of the shape of the ray-florets, these being narrowly linear, 8-9 mm. × 1·0-1·5 mm., gradually narrowed towards the apex and subacute at the tip. Subsequently it was realised that this ray character appears to be invariably associated with deeply-cut leaves, in view of which it seems likely that the correct name should be var. *abrotanoides* J. Murr ex Druce, 1926, *Rep. Bot. Soc. & E.C.*, **7**, 774 ('*foliis tripinnatipartitis*'), which was described from the coast of West Ross.

In 1951 Mr. N. D. Simpson and I noticed it in many places in the southern part of the Lake District and later in that same year I found it on the coast of South Lancashire. I have since found it to be the prevalent form in the Isle of Man. It seems to like damper ground than the typical plant, and I particularly associate it with stream- and river-sides, often by waterfalls.

I seems probable that it is a distinct ecogeographical race of the north and west and may well merit subspecific rank. According to Böcher & Larsen (1955, *Bot. Tidssk.*, **52**, 127), who examined material from south-east Ireland, it has the same chromosome number as the typical plant.—D. E. Allen.

560/2. Taraxacum palustre (Lyons) DC.—The description of this agamospecies by Clapham in the *Flora of the British Isles* (1952, p. 1173) is a good one, but the statement on frequency is misleading and appears to have been causing many workers to put under this name plants which really belong under *T. spectabile* Dahlst. The latter is found almost throughout the British Isles and even in southern England is quite frequent in moist, acid habitats. It is certainly common in upland bogs in the north and west, but it should not be regarded as essentially a montane plant. Similarly, it should not be regarded as necessarily always a plant of wet places, as in South Lancashire, for example, it can be found growing on the dry, fairly open crests of dunes.

T. palustre, by contrast, appears to be a distinctly local plant characteristic of strongly alkaline habitats. Most of its known stations are, in fact, in fens or on the shores of calcareous lakes. I have seen correctly-named material so far from v.c. 23, 27-29, 31, 37, 38, 41, 55, H9, H23, H24. There are also reliable records for v.c. 17, 20, 22 and 24.

Anyone finding *Taraxaca* with appressed outer bracts and ligules reddish on the underside is urged to donate them to the British Museum (Natural History), where, thanks chiefly to the efforts of the late Mr. A. H. G. Alston, the nucleus of a National Dandelion Collection has been built up and a start made at naming material at the biotype level on the basis of determinations by Prof. J. L. van Soest, the foremost European authority on the genus.—D. E. ALLEN.

PLANT RECORDS

Compiled by E. C. Wallace

"Plant Records" are now arranged in the order given in the *List of British Vascular Plants.* (*L.B.V.P.*) By J. E. Dandy (1958).

Records are for the year 1959 where no date is given.

The following signs are used:—

§ before the *L.B.V.P.* number: to indicate that the paragraph contains information necessitating a correction to an annotated copy of the *Comital Flora.*

† before the *L.B.V.P.* number: to indicate that the plant is not a native species in the British Isles.

† before the record: to indicate a species which, though native in some parts of the British Isles, is not so in the locality recorded.

* before the record: to indicate a new vice-county record, not published previously to this issue of the *Proceedings.*

‡ before the record: to indicate a record additional to an annotated copy of the *Comital Flora,* but published elsewhere prior to the issue of the *Proceedings* in which it appears.

[ ] enclosing a record: to indicate doubt as to the validity of the record, either of identification or locality.

It will be useful if, in future, National Grid Co-ordinates, made as accurate as is thought advisable, are added to all records. These will not be published, but the original cards containing them will be filed, and may be made available for reference.

1/4. Lycopodium clavatum L. 37, Worcester; a small patch on a path through a tract of *Vaccinium myrtillus* and *Calluna vulgaris* on the Lickey Hills near Birmingham. Seen for three or four years running prior to 1945, but not seen since and probably lost due to hawthorn scrub growing up, C. J. Cadbury.

4/8. Equisetum pratense Ehrh. 75, Ayr; woodland by river Irvine, Lanfine, H. Milne-Redhead.

7/1. Hymenophyllum tunbrigense (L.) Sm. 101, Kintyre; moss-covered boulders in wet thicket near sea, Dounie, Knapdale, H. Milne-Redhead.

15/6. Asplenium viride Huds. 75, Ayr; rocks in limestone ravine, Penbreck: 97, Westerness; rocks on crag, Sgurr nan Gobhar, c. 2,000 ft., H. Milne-Redhead.

§16/1. Ceterach officinarum DC. *28, W. Norfolk; wall of Saxon cathedral, North Elmham, one plant, Miss E. R. Noble, comm. E. L. Swann.

21/8. DRYOPTERIS AEMULA (Ait.) Kuntze. 101, Kintyre; rocky ground near sea, Carsaig, Knapdale, H. MILNE-REDHEAD.

22/1. POLYSTICHUM SETIFERUM (Forsk.) Woynar. 101, Kintyre; rocky ground by sea, Carsaig, Knapdale, H. MILNE-REDHEAD.

§24/4. THELYPTERIS DRYOPTERIS (L.) Slosson. *19, N. Essex; old wall, Cattle Market, Braintree, a good colony, with *Dryopteris filix-mas*, *D borreri*, *Pteridium aquilinum* and *Phyllitis scolopendrium*, R. M. PAYNE. *27, E. Norfolk; in a drain by disused railway near Mundesley-on-Sea station, K. E. BULL.

44/1. PULSATILLA VULGARIS Mill. [†15-16, Kent; seed has been sown on downs west of Pilgrim House, Trottiscliffe, grid ref. 51/6363607, and Burham Downs, grid ref. 51/725626, F. Rose [1960, *Bull Kent F.C.*, **5**, 7]].

§46/17. RANUNCULUS LENORMANDII F. W. Schultz. *91, Kincardine; rills on sea-shore, Portlethen, U. K. DUNCAN, conf. R. W BUTCHER.

§46/22c. RANUNCULUS AQUATILIS subsp. PSEUDOFLUITANS (Syme) Clapham. *91, Kincardine; river North Esk, near North Water Bridge, Montrose, U. K. DUNCAN, conf. R. W. BUTCHER.

†58/7. PAPAVER LATERITIUM C. Koch. 3, S. Devon; wall-tops, Ottery St. Mary Churchyard: 27, E. Norfolk; by the old windmill, Mundesley-on-Sea, K. E. BULL.

66/4. FUMARIA BASTARDII Bor. 14, E. Sussex; weed of flowerbeds, Egerton Park, Bexhill-on-Sea, K. E. BULL, det. N. Y. SANDWITH.

§67/4. BRASSICA NIGRA (L.) Koch. *†90, Forfar; Ninewells, near Dundee, 1946, U. K. DUNCAN.

§†71/1. HIRSCHFELDIA INCANA (L.) Lagr.Foss. ‡5, S. Som.; Cannington Park, well established in an old quarry, Miss C. M. Andrews (1959, *Proc. Som. Arch. & N.H.S.*, **103**, 95).

89/1. SUBULARIA AQUATICA L. 97, Westerness; Creag Dhubh Lochans, Knoydart, c. 1,550 ft., H. MILNE-REDHEAD.

100/4. ARABIS HIRSUTA (L.) Scop. 102, S. Ebudes; dune land, Ardnave area, Loch Gruinart, Rhinns of Islay: Sanaig Bay and elsewhere, M. H. CUNNINGHAM.

§113/1. VIOLA ODORATA L. *†101, Kintyre; border of path on outskirts of woodland by Limecraigs, near Campbeltown, M. H. CUNNINGHAM.

114/1. POLYGALA VULGARIS L. 75, Ayr; Connor Craigs, H. MILNE-REDHEAD.

§133/4. STELLARIA NEGLECTA Weihe. *27, E. Norfolk; several scattered plants in shady lane near Kelling Heath, Miss R. M. BARNES, comm. E. L. SWANN.

†141/6. ARENARIA BALEARICA L. 3, S. Devon; lane near Dawlish Church; 16, W. Kent; damp wall, Bishopsdown, Tunbridge Wells, K. E. BULL.

§†149/3. MONTIA SIBIRICA (L.) Howell. *102, S. Ebudes; banks of burn near Port Charlotte; in quantity; burnside, Kilchiaran Bay, both Rhinns of Islay, M. H. CUNNINGHAM.

†153/D. AMARANTHUS DEFLEXUS L. 20, Herts; rubbish-tip, Bishops Stortford, 1958, D. MCCLINTOCK, det. J. E. LOUSLEY.

§154/14. CHENOPODIUM RUBRUM L. *90, Forfar; waste ground, Montrose Links, U. K. DUNCAN.

154/16. CHENOPODIUM GLAUCUM L. 27, E. Norfolk; North Walsham cattle-market, abundant, K. E. BULL. 90, Forfar; Sands of Barry, 1953, U. K. DUNCAN, conf. J. P. M. BRENAN.

§156/1. ATRIPLEX LITTORALIS L. *90, Forfar; mouth of river Elliot, near Arbroath, 1954, U. K. DUNCAN, conf. J. P. M. BRENAN.

§†168/3. GERANIUM ENDRESSII Gay. ‡49, Caernarvon; in a remote valley known as Cwm Glasgwm, Penmachno, 1958, M. Morris (1960, *Nature in Wales*, **5**, 858). *90, Forfar; roadside near Letham Grange, 1944, U. K. DUNCAN, conf. E. F. WARBURG.

168/7. GERANIUM SANGUINEUM L. 102, S. Ebudes; dune pasture, Sanaig Bay, Islay, abundant, M. H. CUNNINGHAM, det. at ROYAL BOTANIC GARDENS, KEW.

†168/8. GERANIUM MACRORRHIZUM L. 3, S. Devon; grassy bank, West Hill, Ottery St. Mary, K. E. BULL.

§168/15. GERANIUM LUCIDUM L. ‡31, Hunts.; Stoneley, 1953, I. F. Russell; old railway track between Bluntisham and Earith, Miss P. E. Goodliff (1959, *Rep. Hunts. Fauna & Flora Soc.*, **12**, 11).

†170/7. OXALIS CORYMBOSA DC. 16, W. Kent; plentiful weed in old gardens, Mount Sion, Tunbridge Wells, K. E. BULL, det D. P. YOUNG. 27, E. Norfolk; garden weed, Carrow Abbey, Norwich, R. C. L. HOWITT.

192/24. TRIFOLIUM MICRANTHUM Viv. 31, Hunts.; gravel pit, Needingworth, J. A. Vaughan (1959, *Rep. Hunts. Fauna & Flora Soc.*, **12**, 12).

§206/15. VICIA ANGUSTIFOLIA L. *102, S. Ebudes; roadside, Kilchoman district, near Rockside, Rhinns of Islay, M. H. CUNNINGHAM.

207/10. LATHYRUS JAPONICUS Willd. 112, Zetland; a small colony among *Elymus arenarius* on the low dunes at Nor Wick, Unst. The typical broad-leaved form, not the narrow-leaved form that used to occur in Burrafirth, Unst, C. J. CADBURY.

§211/1. RUBUS CHAMAEMORUS L. *75, Ayr; summit peat, The Knipe, c. 1,800 ft.: 80, Roxburgh; summit peat, Comb Hill, c. 1,600 ft., H. MILNE-REDHEAD.

§218/2. AGRIMONIA ODORATA (Gouan) Mill. *90, Forfar; roadside near Letham Grange Station, 1946, U. K. DUNCAN, conf. E. C. WALLACE.

220/3(2). ALCHEMILLA VESTITA (Buser) Raunk. 103, Mid Ebudes; near Craignure, Isle of Mull, 1958, E. P. BEATTIE and U. K. DUNCAN, conf. S. M. WALTERS.

220/3(8). ALCHEMILLA XANTHOCHLORA Rothm. 103, Mid Ebudes; near Kilninian, Isle of Mull, 1958, E. P. BEATTIE and U. K. DUNCAN, conf. S. M. WALTERS.

§221/2. APHANES MICROCARPA (Boiss. & Reut.) Rothm. *104, N. Ebudes; near Waterstein Head, Skye, 1958, U. K. DUNCAN, conf. S. M. WALTERS.

†225/5. ROSA RUGOSA Thunb. 27, E. Norfolk; naturalised in several places, Mundesley-on-Sea; cliffs at Sidestrand, K. E. BULL.

229/2×230/1. ×CRATAEMESPILUS GRANDIFLORA (Sam.) Camus. 83, Edinburgh; one small tree, in wild part of Melville Castle grounds, Lasswade, E. B. BASDEN, det. E. F. WARBURG.

§232/1. SORBUS AUCUPARIA L. ‡31, Hunts.; epiphytic on *Salix alba* var. *coerulea*, bank of river Nene, Stibbington, J. L. Gilbert (1957, *Rep. Hunts. Fauna & Flora Soc.*, **10**, 12). But see *Victoria History of the County of Huntingdonshire*, **1**, 58 (1926).—ED.

235/12. SEDUM VILLOSUM L. 75, Ayr; rivulet flowing into Garepool Burn, c. 850 ft.; banks of Greenock Water, c. 875 ft., H. MILNE-REDHEAD.

247/2. DROSERA ANGLICA Huds. 75, Ayr; sparsely on Airds Moss, c. 700 ft., H. MILNE-REDHEAD.

262/4. CALLITRICHE HAMULATA Kütz. ex Koch. 56, Notts.; pool, Martin Common, R. C. L. HOWITT det. J. P. SAVIDGE.

319/2. Euphorbia lathyrus L. †101, Kintyre; occurs annually as a garden weed in Low Askomil, Campbeltown, M. H. Cunningham.

§319/12. Euphorbia portlandica L. *102, S. Ebudes; seashore, Lossit Bay, Rhinns of Islay, M. H. Cunningham, det. at Royal Botanic Gardens, Kew.

†320/7. Polygonum amplexicaule D. Don. 14, E. Sussex; established in hedge, Tangier Lane, Tunbridge Wells, K. E. Bull.

§320/11. Polygonum nodosum Pers. ‡52, Anglesey; cornfield near Holyhead Mountain, 1957, R. Lewis and M. Morris (1960, *Nature in Wales*, **5**, 858).

§†320/19. Polygonum cuspidatum Sieb. & Zucc. *28, W. Norfolk; now established in many places—railway sidings, King's Lynn; arable fields, Setch; waste ground, Hockwold, E. L. Swann.

†320/20. Polygonum sachalinense F. Schmidt. 14, E. Sussex; Lordswell Lane, Crowborough; waste ground, Polegrove recreation-ground, Bexhill-on-Sea: 27, E. Norfolk; established on cliffs, Overstrand, K. E. Bull.

330/5. Ulmus carpinifolia Gled. †90, Forfar; by skating-pond, Arbroath, 1954, U. K. Duncan, det. R. Melville.

†331/1. Ficus carica L. Kintyre; growing out from the stonework of the old main road bridge, Muasdale, W. Kintyre, bearing fruit, M. H. Cunningham, det. at Royal Botanic Garden, Edinburgh.

343/4. Salix fragilis var. basfordiana (Scaling ex Salt.) Bean. 31, Hunts.; Monk's Wood, J. L. Gilbert, det. R. D. Meikle (1959, *Rep. Hunts. Fauna & Flora Soc.*, **12**, 12).

389/2. Cynoglossum germanicum Jacq. [15, E. Kent; seed sown along wooded upper bank of the Pilgrim's Way between Wrotham and Birling, F. Rose (1960, *Bull. Kent Field Club*, **5**, 7)].

†392/3. Symphytum orientale L. 27, E. Norfolk; West Runton, plentiful; by Roman Catholic Church, North Walsham, K. E. Bull.

400/7. Myosotis sylvatica Hoffm. 28, W. Norfolk; a small colony by side of fen carr, Cranberry Rough, Hockham, 1948, E. L. Swann, det. A. E. Wade.

§402/1. Mertensia maritima (L.) Gray. *102, S. Ebudes; seaside shingle near Portnahaven, Rhinns of Islay, in fair quantity, M. H. Cunningham.

§†406/3. Calystegia silvatica (Kit.) Griseb. ‡52, Anglesey; very abundant near the Tubular Bridge, R. H. Roberts (1960, *Nature in Wales*, **5**, 858).

†406/P. Calystegia pulchra Brummitt & Heywood. 89, E. Perth; marsh by river Tay, Errol, 1958: 90, Forfar; near Lunan Water, by Kinnell Church: 91, Kincardine; roadside by Laurencekirk: 106, E. Ross; waste ground, Fortrose, 1958, U. K. Duncan, det. R. K. Brummitt.

†408/1. Nicandra physalodes (L.) Gaertn. 28, W. Norfolk; a few plants growing among potatoes at Longham, near Dereham, K. Durrant, comm. E. L. Swann.

420/3. Linaria repens (L.) Mill. 27, E. Norfolk; established on wall, Wroxham Churchyard, K. E. Bull.

†420/M. Linaria maroccana Hook. 27, E. Norfolk; many plants naturalised on sandy ground, cliff-top, Cliftonville, Mundesley-on-Sea, K. E. Bull.

441/1. Pinguicula lusitanica L. 97, Westerness; by rivulet flowing into Scotus Burn, Inverie Bay, H. Milne-Redhead.

442/3. Utricularia intermedia Hayne. 73, Kirkcudbright; bog, Heart Moss, c. 400 ft.; bogs, Craigencallie: 97, Westerness; bog pools, Sandaig, Knoydart, c. 50 ft., H. Milne-Redhead.

442/4. Utricularia minor L. 72, Dumfries; boggy pool, Hightown Hill, Tinwald, c. 700 ft.: 73, Kirkcudbright; flowering freely in Forestry drainage ditches, Craigencallie, c. 600 ft., H. Milne-Redhead.

§448/2. Thymus serpyllum L. *28, W. Norfolk; a few plants by roadside near Emily's Wood, Brandon, 1958, E. L. Swann.

459/3. Stachys arvensis (L.) L. 24, Bucks.; chalky field, Booker, F. Ambrose.

§485/7. Galium sterneri Ehrend. *75, Ayr; rocky banks of ravine, Connor Hill, c. 1,100 ft., H. Milne-Redhead.

†500/C. Cephalaria elata (Hornem.) Schrad. ex Roem. & Schult. 27, E. Norfolk; established at edge of roadside pond, Ridlington, near Bacton, K. E. Bull.

502/1. Bidens cernua var. radiata DC. 28, W. Norfolk; scattered plants by lake, Stradsett, E. W. Swann.

†503/1. Galinsoga parviflora Cav. 27, E. Norfolk; rubbish-tip near Burnham Overy Staithe, K. E. Bull. 59, S. Lancs.; bare ground in front of newly erected building, Manchester; exterminated shortly afterwards by gardeners, J. N. Mills.

§†503/2. Galinsoga ciliata (Raf.) Blake. *22, Berks.; Maidenhead Corporation rubbish-tip, F. Ambrose.

†506/9. Senecio tanguticus Maxim. 90, Forfar; island in river North Esk, near Montrose, far from habitation; apparently bird-sown; increasing annually, U. K. Duncan, det. C. C. Townsend.

515/4. Gnaphalium uliginosum L. 57, Derby; Ladyblower Reservoir; colonising with great rapidity and in prodigal abundance, the bed of the reservoir exposed after prolonged drought; the only vegetation over extensive areas, J. N. Mills.

†521/5. Erigeron mucronatus DC. 27, E. Norfolk; wall, Beeston Regis Church, in small quantity, K. E. Bull. 41, Glamorgan; Dinas Powis, 1958, D. McClintock.

†535/3. Artemisia biennis Willd. 29, Cambs.; field close to Fordham Station, plentiful, 1957, K. E. Bull.

543/1. Saussurea alpina (L.) DC. 97, Westerness; steep rocks in ravine, Allt Coir' Each Ladhar Bheinn, c. 1,750 ft., H. Milne-Redhead.

Hieracium all det. by P. D. Sell and C. West

558/1(33). Hieracium anglicum Fr. 97 (Argyll); Ben na-h-Uamha, Morvern: 104, N. Ebudes; Crossal, Glen Drynoch, near Sligachan, Skye, A. McG. Stirling.

558/1(42). Hieracium shoolbredii E. S. Marshall. 97 (Argyll); near Killundine; Ben na-h-Uamha, Morvern: 103, Mid Ebudes; near Sorisdale, Isle of Coll: 104, N. Ebudes; Crossal, Glen Drynoch, near Sligachan, Skye, A. McG. Stirling.

558/1(53). Hieracium argenteum Fr. 73, Kirkcudbright; Screel Hill, near Dalbeattie: 104, N. Ebudes; Braes, near Portree, Skye, A. McG. Stirling.

558/1(58). Hieracium chloranthum Pugsl. 104, N. Ebudes; Crossal, Glen Drynoch, near Sligachan, Skye, A. McG. Stirling.

558/1(59). Hieracium orimeles F. J. Hanb. ex W. R. Linton. 104, N. Ebudes; Braes, near Portree, Skye, A. McG. Stirling.

†558/1(92). Hieracium scotostictum Hyland. 14, E. Sussex; disused railway siding, south of Horam Station, 1951, K. E. Bull.

558/1(94). Hieracium duriceps F. J. Hanb. 97 (Argyll); Ben-na-h-Uamha, Morvern: 105, W. Ross; near Shiel Bridge, west end of Loch Duich, A. McG. Stirling.

558/1(138). HIERACIUM CRAVONIENSE (F. J. Hanb.) Roffey. 73, Kirkcudbright; rocky bank of river Urr near Corsock, Castle Douglas, A. McG. STIRLING.

558/1(149). HIERACIUM VULGATUM Fr. 73, Kirkcudbright; Balloch Burn, near Creetown; Mossyard Bay, Gatehouse-of-Fleet; old quarry near Kirkcudbright; Torrs Point, Kirkcudbright: 75, Ayr; old quarry near Dalmellington: 104, N. Ebudes; Crossal, Glen Drynoch, near Sligachan, Skye, A. McG. STIRLING.

558/1(163). HIERACIUM STRUMOSUM (W. R. Linton) A. Ley. 32, Northants.; Greatworth, old railway near road-crossing north of Greatworth Hall, 1958, A. MELDERIS.

558/1(219). HIERACIUM PERPROPINQUUM (Zahn) Druce. 73, Kirkcudbright; bank of river Urr near Corsock, Castle Douglas; old quarry near Kirkcudbright, A. McG. STIRLING.

558/1(222). HIERACIUM SALTICOLA (Sudre) Sell & West. 55, Leics.; Swithland's Wood, Newton Linford, E. B. BANGERTER.

§559/2. CREPIS VESICARIA subsp. TARAXACIFOLIA (Thuill.) Thell. 95, Elgin; the specimen on which the record for v.c. 95 was based (1954, *Proc. B.S.B.I.*, **1**, 173) has been redetermined as *C. capillaris* var. *anglica* Druce & Thell. by J. B. Marshall. Delete from *C.F.*

†560/B. BACCHARIS HALIMIFOLIA L. 9, Dorset; shore near Poole Pottery Factory, Hamworthy, 1958, D. MCSLINTOCK.

†571/1. LAGAROSIPHON MAJOR (Ridl.) Moss. 16, W. Kent; established in Brighton Lake, Bridge Road, Tunbridge Wells, K. E. BULL.

§576/2. ZOSTERA ANGUSTIFOLIA (Hornem.) Reichb. ‡16, W. Kent; muddy foreshore, Isle of Grain, Mrs. K. Side (1960, *Bull. Kent F.C.*, **5**, 14).

577/16. POTAMOGETON TRICHOIDES Cham. & Schlecht. 27, E. Norfolk; abundant in dyke, Lessingham, G. H. ROCKE and E. L. SWANN.

577/17. POTAMOGETON COMPRESSUS L. 27, E. Norfolk; abundant in dyke, Upton, G. H. ROCKE and E. L. SWANN.

577/18. POTAMOGETON ACUTIFOLIUS Link. 27, E. Norfolk; still a few plants at Buckenham where Arthur Bennett found it in 1880, G. H. ROCKE and E. L. SWANN.

§581/1. NAJAS FLEXILIS (Willd.) Rostk. & Schmidt. *73, Kirkcudbright; Loch Kindar, submerged at about 7 ft., floating scraps first noted while boating, H. MILNE-REDHEAD.

§†593/2. Lilium pyrenaicum Gouan. ‡5, S. Som.; near Wellington, thoroughly established and regenerating in an old plantation, J. D. U. Ward (1959, *Proc. Som. Arch. & N.H.S.*, **103**, 96).

598/1. Ornithogalum umbellatum L. 3, S. Devon: railway banks near Lympstone Station, K. E. Bull.

§603/1. Paris quadrifolia L. 72, Dumfries; Laight Wood, Scar Glen, two patches, c. 375 ft., H. Milne-Redhead. Remove from brackets in *C.F.*—Ed.

605/14. Juncus maritimus Lam. 102, S. Ebudes; marshy ground by seashore on west side of Loch Gruinart, Islay, M. H. Cunningham.

§616/3. Iris foetidissima L. *56, Notts.; Dyscar Wood, Langold, on limestone, R. C. L. Howitt.

625/6. Epipactis phyllanthes G. E. Sm. 13, W. Sussex; southern end of Swanbourne Lake, Arundel Park, about 18 plants, B. M. C. Morgan and D. Powell, det. D. P. Young.

628/2. Listera cordata (L.) R. Br. 73, Kirkcudbright; north-facing slope, Knockendoch, c. 1,000 ft.: 75, Ayr; north-facing slope in short vegetation, West Foredibban Hill, c. 1,250 ft.; north-facing slope at 1,550 ft., summit peat-bog at 1,800 ft., The Knipe: 97, Westerness; rocky ledges by waterfall Eas a'Chaoruinn, Amhainn Bheag, Knoydart, c. 350 ft., H. Milne-Redhead.

635/1. Coeloglossum viride (L.) Hartm. 97, Westerness; overhung grassy ledges, Coire na Ciche, Knoydart, 2,250 ft., H. Milne-Redhead.

640/3. Ophrys sphegodes Mill. 17, Surrey; a single plant in chalk scrub above Limpsfield; the first authentic Surrey record for 50 years, but likely to be the progeny of a Kentish specimen planted at the same spot as an experiment by Dr. F. Rose in 1942, B. S. Brookes and P. R. Norman, comm. D. P. Young.

643/3. Dactylorchis incarnata (L.) Vermeul. 72, Dumfries; marshy ground, Earshaig, c. 725 ft., H. Milne-Redhead.

645/1. Anacamptis pyramidalis Rich. 102, S. Ebudes; duneland pasture by Loch Gruinart, near Ardnave, in quantity; also in similar ground on the west side of Loch Gruinart, M. H. Cunningham, det. V. S. Summerhayes.

§650/2. Lemna trisulca L. *72, Dumfries; Glengar Loch, above Penpont, c. 575 ft., H. Milne-Redhead.

656/2. Eleocharis acicularis (L.) Roem. & Schult. 72, Dumfries; barely submerged, edge of Castle Loch, Lochmaben, c. 140 ft., H. Milne-Redhead.

§656/6. ELEOCHARIS UNIGLUMIS (Link) Schult. *90, Forfar; near Mains of Usan, by Montrose, 1955, U. K. Duncan, conf. E. C. WALLACE.

663/1. CAREX LAEVIGATA Sm. 24, Bucks.; Stoke Wood, F. AMBROSE, det. F. H. PERRING.

663/2. CAREX DISTANS L. 97, Westerness; shore of Inverie Bay, Knoydart, H. MILNE-REDHEAD.

663/21. CAREX ACUTIFORMIS Ehrh. 73, Kirkcudbright; marshy ground near sea, Gutcher's Isle, Colvend, H. MILNE-REDHEAD.

663/28. CAREX LIMOSA L. 97, Westerness; peaty edge of Creag Dubh Lochans, Knoydart, c. 1,550 ft., H. MILNE-REDHEAD.

663/29. CAREX PAUPERCULA Michx. 72, Dumfries; bog, Earshaig, c. 750 ft.; boggy ground, Friarminnan, c. 1,150 ft.; boggy ground, Black Loch, c. 400 ft.: 75, Ayr; Blood Moss, 975 ft., H. MILNE-REDHEAD.

663/33. CAREX LASIOCARPA Ehrh. 73, Kirkcudbright; dominant in bog, Heart Moss, c. 400 ft., H. MILNE-REDHEAD.

663/46×50. CAREX × TURFOSA Fr. 27, E. Norfolk; Wheatfen Broad, 1943, E. L. SWANN, det. A. C. JERMY.

663/72. CAREX CURTA Gooden. 56, Notts.; Ling's Wood, Scaftworth, R. C. L. HOWITT.

§663/78. CAREX PAUCIFLORA Lightf. 73, Kirkcudbright; sparsely by White Laggan Burn, at 1,200 ft.: 75, Ayr; sparsely, Limmerhaugh Muir, at 650 ft.: 77, Lanark; Blood Moss, at 975 ft., H. Milne-Redhead. Remove from brackets in *C.F.*—Ed. 97, Westerness; plentiful in wet ground, Glen Dessarry, c. 850 ft., H. MILNE-REDHEAD.

669/2. GLYCERIA PLICATA Fr. 73, Kirkcudbright; High Nunton, filling a pond, c. 125 ft., H. MILNE-REDHEAD.

§669/3. GLYCERIA DECLINATA Bréb. *75, Ayr; ditch, Penbreck, H. MILNE-REDHEAD.

676/2. POA INFIRMA Kunth. 1, W. Cornwall; cliff top, Cape Cornwall, R. C. L. HOWITT.

681/2. MELICA NUTANS L. 75, Ayr; limestone ravine, Penbreck, at 1,200 ft., H. MILNE-REDHEAD.

683/2. BROMUS RAMOSUS Huds. 97, Westerness; low wooded cliff by shore, Inverie Bay, Knoydart, H. MILNE-REDHEAD.

683/12. BROMUS THOMINII Hardouin. 90, Forfar; Lunan Bay, near Montrose, 1944, U. K. DUNCAN, det. C. E. HUBBARD.

†683/M. BROMUS MARGINATUS Nees. 14, E. Sussex; sewage-farm, Lindfield, apparently well established, 1958, R. C. PALMER, det. J. KENNEDY-O'BYRNE.

CHAROPHYTA all det. G. O. ALLEN.

NITELLA CAPILLARIS (Krock.) Gr. & B.-W. 29, Cambs.; Sutton Gault, G. H. ROCKE. Last recorded from here, the only British locality by G. R. Bullock-Webster on 16th May 1899, G. O. ALLEN.

TOLYPELLA GLOMERATA (Desv.) Leonh. *56, Notts.; Langold Lake, R. C. L. HOWITT.

CHARA VULGARIS var. PAPILLATA Wallr. 36, Hereford; Mordiford, L. E. WHITEHEAD.

§CHARA CONNIVENS Braun. *4, N. Devon; Lifton, O. GREIG.

CHARA DELICATULA Desv. 73, Kirkcudbr.; Tongland Bridge, R. C. L. HOWITT.

ABSTRACTS FROM LITERATURE

Compiled by D. H. Kent

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SYSTEMATIC

1→ Pteridophyta. Jermy, A. C., 1959, A preliminary census list of British Pteridophytes, *Brit. Fern Gaz.*, **9**, 4-15. A preliminary revision of the vice-comital distribution of the British pteridophyta.—[D.H.K.]

5→ Pteropsida. Holttum, R. E., 1959, Some notes on vegetative characters of ferns, *Brit. Fern Gaz.*, **9**, 2-4.

15. Asplenium. Tatic, B., 1958, Asplenium adulterinum Milde nova vista za floru Srbije, *Bull. Mus. Hist. Nat. Belgrade, Sér. B, Sciences Biol.*, **12**, 231-236. *Asplenium adulterinum* has been found for the first time in Serbia.—[D.H.K.]

20/2. Woodsia alpina (Bolton) Gray. Greenfield, P., 1959, Woodsia alpina (Bolton) Gray, *Brit. Fern Gaz.*, **9**, 25-26.

21/2×1. Dryopteris × tavelii Rothm. Lawalrée, A., 1959, Répartition en France et présence en Autriche et en Yougoslavie de Dryopteris × tavelii Rothm., *Bull. Research Council Israel, Sect. D, Botany*, **7D**, 181-183. *Dryopteris × tavelii* Rothm. is new for the flora of Austria and of Yugoslavia. In France, this rare plant is scattered throughout almost the whole land.—[Author's summary.]

27/1. Azolla filiculoides Lam. Tralau, H., 1959, Extinct aquatic plants of Europe. On the fossil and recent distribution of Azolla filiculoides, Dulichium arundinaceum, Brasenia schreberi and Euryale ferox, *Bot. Not.*, **112**, 386-406.

29/1. Ophioglossum vulgatum L. Boullard, B., 1959, Découverte de gamétophytes de l'Ophioglossum vulgatum L. en Normandie, *Bull. Soc. Linn. Normandie*, **9**, 112-118. In late May 1958 the author collected 22 filiform prothalli of *Ophioglossum vulgatum* growing at about 10-15 cms. below the soil surface amongst the roots of the parent species at Mauvaines and Cavigny (Manche). They were yellowish, unbranched, up to 2 cms. long; even the smallest, 6 mm. long, had sex organs observable with a good hand lens. A microscopical examination showed endophytic fungi, confined to a cylinder of 2-4 cells thick, in the cortical area, and it is suggested that the scarcity of prothalli may be due to the chances of fungi arriving at the critical time. The author also considers that meteorological conditions may be important.—[A.C.J.]

36. Caltha. Tolmatchev, A., 1955, Nota de Caltha orientis extremii, *Not. Syst. Herb. Inst. Bot. Nom. V.L. Komarovii Acad. Sci. U.R.S.S.*, **17**, 144-159.

46/20. Ranunculus circinatus Sibth. Salisbury, E. J., 1960, Variation in the flowers of Ranunculus circinatus Sibth., *Kew Bull.*, **14**, 34-36.

58. Papaver. Hrishi, N. J., 1960, Cytogenetical studies on Papaver somniferum L. and Papaver setigerum DC. and their hybrid, *Genetica*, **31**, 1-130.

58. Papaver. McNaughton, I. H. and Harper, J. L., 1960, The comparative biology of closely related species living in the same area. 1. External breeding-barriers between Papaver species, *New Phyt.*, **59**, 15-26. It has been demonstrated that in Britain five species of *Papaver* (a) frequently occur together, (b) flower over the same general period, (c) are normally insect-pollinated and possess insect visitors in common. Hybrids are rare under natural conditions although some can easily be produced artificially.

The external barriers reducing the chances of natural hybridization are the facts that (a) some of the species have mechanisms facilitating self-pollination, and (b) specific selection by the principal insect visitor, the honey-bee, tends to reduce the chances of cross-pollination between the species.—[Author's summary.] 2. Aberrant morphology and a virus-like syndrome in hybrids between Papaver rhoeas L. and Papaver dubium L., *l.c.*, **59**, 27-41. The hybrids *Papaver dubium* × *rhoeas*, and the reciprocal cross, have been produced by artificial cross-pollination. The hybrids are not intermediate in character between the parents and are highly variable. Three main classes may be recognised although these intergrade: (a) forms which die in the rosette stage from a characteristic apical die-back, (b) forms which lose apical dominance and become bushy, with chlorotic, distorted leaves and abortive flower buds—resembling certain virus syndromes (e.g. tomato bushy stunt), (c) forms which retain a degree of apical dominance and produce small open flowers, which are both male—and female-sterile, in numbers much higher than in either parent.

The hybrids are much less vigorous than the parent in the field, where they rarely survive under experimental conditions.

Few previously recorded natural hybrids between these species can be accepted as valid, and most published descriptions of the hybrids seem to be based on aberrant specimens of the species, not on hybrids. Naturally occurring hybrids have been found near Oxford which conform well with bybrids produced artificially.—[Authors' summary, p.p.]

58/6. Papaver somniferum L. Danert, S., 1958, Zur Systematik von Papaver somniferum L., *Die Kulturpflanze*, **6**, 61-88.

68/1. Erucastrum gallicum (Willd.) O. E. Schulz. Golicin, S., 1957, De Erucastro gallico O. Schulz in Flora URSS hucusque non indicato, *Not. Syst. Herb. Inst. Bot. Nom. V.L. Komarovii Acad. Sci. U.R.S.S.*, **18**, 90-97.

74/3. Raphanus sativus L. Nadir, M., 1959, Etude comparée de quelques propriétés physiologiques de Raphanus sativus L. diploide et tetraploide, *Bull. Soc. Hist. Nat. Toulouse*, **94**, 359-392.

75/1. Crambe maritima L. Gehu, J.-M. and J., 1959, Note phytoécologique concernant la station de Crambe maritima L. de l'anse Du Guesclin (Ille-et-Villaine), *Bull. Lab. Marit. Dinard*, **45**, 56-62. An ecological study of *Crambe maritima* in a locality from which it is said to be disappearing and where evidence shows it belongs to a floristic and ecological group with its own individuality.—[E.B.B.]

104. HESPERIS. Tzvelev, N., 1959, Genus Hesperis L. in URSS, *Not. Syst. Herb. Inst. Bot. Nom. V.L. Komarovii Acad. Sci. U.R.S.S.*, **19**, 114-155. Describes and keys the species of *Hesperis* found in the U.S.S.R.—[D.H.K.]

115. HYPERICUM. Fröhlich, A., 1960, Križenci trezalek (Hypericum) v ČSR, *Preslia*, **32**, 97-99. The hybrids *Hypericum maculatum* subsp. *eumaculatum* × *acutum* and *H. maculatum* subsp. *eumaculatum* × *perforatum* are described from Czechoslovakia.—[D.H.K.]

117/1. TUBERARIA GUTTATA (L.) Fourr. Proctor, M. C. F., 1960, Tuberaria guttata (L.) Fourreau (Biological Flora), *J. Ecol.*, **48**, 243-253.

122/1. ELATINE HEXANDRA (Lapierre) DC. Leeuwen, C. G. Van, 1958, Elatine hexandra (Lap.) DC. en Gratioea officinalis L. in het wiel bij Nieuwkuik, *Correspondentieblad* (Rijksherbarium), **9**, 98-99.

123→ CARYOPHYLLACEAE. Pedersen, A., 1959, Caryophyllaceernes udbredelse i Danmark, *Bot. Tidssk.*, **55**, 157-168. The distribution of the various species of the *Caryophyllaceae* in Denmark is outlined, discussed and illustrated by maps.—[D.H.K.]

127. DIANTHUS. Hooper, S., 1959, The genus Dianthus in Central and South Africa, *Hook. Icon. Pl.*, **37**, 1-58.

131. CERASTIUM. Novák, A., 1960, Fylogenese serpentinových typu, *Preslia*, **32**, 1-8.

141/5. ARENARIA GOTHICA Fr. Tralau, H., 1959, On the distribution of Arenaria gothica Fries and the significance of postglacial plant migration, *Ber. Schweiz. Bot. Ges.*, **69**, 342-345.

149. MONTIA. Lawalrée, A., 1960, Revision des Montia de Belgique de l'herbier de Jardin Botanique de l'Etat, *Bull. Jard. Bot. Brux.*, **30**, 97-104. The four subspecies of *Montia fontana* recognized by Walters in the British Isles also occur in Belgium. Their distribution, as shown by a study of material in the herbarium of the Belgian National Botanic Garden, is given in detail. The distribution of subsp. *variabilis* Walters is shown for the first time, this taxon not having been previously recognised in the Belgian flora.—[E.B.B.]

159/2. SALSOLA PESTIFER A. Nels. Rzedowsky, J., 1959, Salsola kali var. tenuifolia, una peligrosa maleza exótica que está extendiéndose hácia el Centro de Mexico, *Bol. Soc. Bot. Mexico*, **24**, 53-59. An account of the extension of the area of distribution of this introduced weed in northern Mexico in recent years, with illustrations and map, and an account of its distribution elsewhere, ecology, damage caused and methods of control.—[J.E.L.]

162/1. TILIA PLATYPHYLLOS Scop. Rose, F., 1960, Tilia platyphyllos Scop. in Kent, *Bull. Kent F.C.*, **5**, 29.

177. EUONYMUS. Klokov, M., 1959, De Euonymo Europaea auct Florae URSS, *Not. Syst. Herb. Inst. Bot. Nom. V.L. Komarovii Acad. Sci. U.R.S.S.*, **19**, 274-329.

190. MEDICAGO. Heyn, C. C., 1959, The genus Medicago L. in Linnaeus's Species Plantarum, *Bull. Research Council Israel, Sect. D, Botany*, **7D**, 157-174. The part of the *Species Plantarum* dealing with the genus *Medicago* has been critically reviewed. Linnaeus's concept of *Medicago* and its subdivisions are discussed. The relevant material

in the Linnean Herbarium, the Hortus Siccus Cliffortianus and the Linnean Herbarium of the Linnean Society of London have been examined. Based on the examination of the species and the literature cited by Linnaeus, the genus *Medicago* L. and the nine species and thirteen varieties included by Linnaeus in it are typified. The inevitable changes in nomenclature affect three species, *M. polymorpha*, *M. turbinata* and *M. tornata*. In most varieties of *M. polymorpha*, which were later raised to the rank of species, the change of the author's name in current usage was found to be necessary. The typical intraspecific taxon of each subdivided species is established. It is shown that the type specimen of *Medicago* is *M. radiata* L. and not *M. sativa* L. as generally accepted. However, as the former species differs from all other species of *Medicago* in some important pod and seed characters, its separation from the genus *Medicago* and the conservation of the generic name *Medicago* L. are proposed.—[Author's summary.]

190/2. MEDICAGO SATIVA L. Makarevich, V. N., 1959 The individual variations in the lucerne (Medicago sativa L.), tall oat grass (Arrhenatherum elatius M. et K.) and Hungarian brome (Bromus inermis Leyss.), *Bot. Zhurn.*, **44**, 1599-1605 (in Russian).

190/3. MEDICAGO LUPULINA L. Medvedev, P. F., 1959, Regarding the life-form of Medicago lupulina L., *Bot. Zhurn.*, **44**, 1496-1498 (in Russian).

192/13. TRIFOLIUM SUBTERRANEUM L. Morley, F. H. W., 1959, Subspeciation in Trifolium subterraneum L., *Proc. 10th Intern. Congr. Genetics*, **2**, 194-195.

195. LOTUS. Lainz, M., 1960, Lotus uliginosus Schkuhr (1804) ein unausrottbarer name?, *Bull. Jard. Bot. Brux.*, **30**, 35-36. The author shows that the name **Lotus pedunculatus** Cav. (1793) is the correct name for the species at present known as *L. uliginosus* Schkuhr (1796). —[D.H.K.]

206. VICIA. Hermann, F. J., 1960, *Vetches of the United States—Native, Naturalized and Cultivated.* U.S. Department of Agriculture, *Agriculture Handbook*, No. **168**, pp. 1-84. Describes and illustrates with drawings thirty-five species of *Vicia* known in the U.S.A. Keys are given to species and varieties and details of synonymy and geographical range are also provided.—[D.H.K.]

207/6. LATHYRUS SYLVESTRIS L. Hansen, A. & Pedersen, A., 1960, Noter om Dansk flora og vegetation, 16. Skov-fladbaelg (Lathyrus silvestris) som vejskraent-og baneterruenplante, *Flora og Fauna*, **66**, 46-48. *Lathyrus sylvestris*, a plant of woods and thickets in Denmark, has recently been found on roadsides and about railway premises. Its occurrence in these habitats is attributed to seeds and plants being introduced with ballast and road materials.—[D.H.K.]

211. RUBUS. Britton, D. M., 1959, Chromosome studies in Rubus, *Proc. 10th Intern. Congr. Genetics*, **2**, 35.

212. POTENTILLA. Skalinska, M. & Czapik, R., 1959, Badania cytologiczne nad rodzajem Potentilla L., *Acta Biol. Cracov.*, *Sér. Bot.*, **1**, 137-149. 76 populations of 12 species of *Potentilla* were studied in Poland. In populations of *P. crantzii* from the Tatra Mountains the tetraploid number was found, whereas for plants from northern habitats

the hexaploid number had been reported by earlier investigators. Likewise populations of *P. arenaria* in Poland have a lower chromosome number ($2n=28$) than Swiss populations. On the other hand, some species with an intraspecific karyological differentiation are represented in the material from Poland by rather high polyploids: *P. argentea* and *P. verna* are predominant hexaploid, *P. recta* is also hexaploid while *P. procumbens* is octoploid.

A new number ($2n=56$) is reported for *P. intermedia*. A pentaploid and a hexaploid specimen have been detected within the tetraploid species *P. erecta* and *P. reptans* respectively. The possible mode of origin of these aberrant types is discussed.—[Authors' summary, p.p.]

212. POTENTILLA. See 215. FRAGARIA.

215. FRAGARIA. Dowrick, G. J. and Williams, H., 1960, Species crosses in the genus Fragaria, *Ann. Rep. John Innes Hort. Inst.*, **50**, 9-10.

215. FRAGARIA. Ellis, J. R., 1959, Intergeneric hybridisation between Fragaria and Potentilla, *Proc. 10th Intern. Congr. Genetics*, **2**, 74. In a recent series of intergeneric pollinations between the cultivated octoploid strawberry and six British species of *Potentilla*, some fairly vigorous intergeneric hybrids have been raised from crosses where the *Fragaria* cultigen was used as the female parent. The *Potentilla* species used were *P. fruticosa* ($2n=44$), *P. erecta* ($2n=28$), *P. reptans* ($2n=28$), *P. sterilis* ($2n=28$), *P. palustris* ($2n=42$) and *P. anglica* ($2n=56$).

Details are given of the results of these experimental crossings.—[D.H.K.]

217. DRYAS. Hultén, E., 1959, Studies in the genus Dryas, *Svensk Bot. Tidsk.*, **53**, 507-542.

220. ALCHEMILLA. Sougnez, N. and Lawalrée, A., 1959, Les Alchemilla de Belgique, *Bull. Jard. Bot. Brux.*, **29**, 389-423. An account of the genus *Alchemilla* in Belgium. Detailed descriptions, notes on distribution and ecology and a long key to the following species are given:—*A. hoppeana*, *A. glabra*, *A. xanthochlora*, *A. acutiflora*, *A. filicaulis*, *A. vestita*, *A. gracilis*, *A. monticola*, *A. hybrida*, all of which, except *A. gracilis*, occur in the British Isles.

New taxa are:—

A. glabra var. *dasyneura*: differs from the typical plant in being appressed-pilose on the whole length of the veins of the underside of the basal aestival leaves and the three lower internodes of the flowering stem.

A. filicaulis var. *dasycaula*: differs from the typical plant in its larger size, thicker and more pilose stems and larger leaves.

A. filicaulis var. *lasiocalyx*: differs from the typical plant in its stems being often flexuous, stipules reddish-brown and pilose sepals.

A. vestita var. *calvescens*: differs from the typical plant in having upper part of stems glabrescent and flowers less pilose.

Distribution maps are provided and *A. acutiloba* and *A. hybrida* are figured.—[E.B.B.]

225. ROSA. Harrison, J. W. Heslop-, 1960, Wild roses flowering twice in 1959, *Vasc.* (*Subst.*), **45**, 7.

232. SORBUS. Kárpáti, Z., 1960, Die Sorbus-Arten Ungarns und der angrenzenden Gebiete, *Fedde Rep.*, **62**, 71-331.

239. SAXIFRAGA. Jones, E. M. Marsden- and Turrill, W. B., 1960, Saxifrages from Brandon Mountain, Co. Kerry, *Kew Bull.*, **14**, 105-107.

252/1. HIPPOPHAE RHAMNOIDES L. Sipkes, C., 1959, Rassenvorming bij Hippophaë rhamnoides L., *Correspondentieblad*, **14**, 150-151.

252/1. HIPPOPHAE RHAMNOIDES L. White, E. H., 1959, Hippophaë rhamnoides in the Isle of Wight, *Proc. Isle of Wight Nat. Hist. & Arch. Soc.*, **5**, 101.

255/1. CHAMAENERION ANGUSTIFOLIUM (L.) Scop. Protopopov, V. V., 1959, Microclimatic conditions in pure stands of great willow-herb (Epilobium angustifolium L.), *Bot. Zhurn.*, **44**, 1143-1188 (in Russian).

256. OENOTHERA. Elliott, R., 1959, The Evening Primrose, *Quart. Bull. Alpine Gard. Soc.*, **27**, 302-310.

262. CALLITRICHE. Mason, R., 1959, Callitriche in New Zealand and Australia, *Austral. J. Bot.*, **7**, 295-327. A revision of *Callitriche* in New Zealand and Australia shows that 13 species (one with 2 subspecies) occur in these countries, of which *C. capricorni* (Queensland), *C. petriei* (New Zealand) and *C. aucklandica* (Auckland Isles) are new. *C. palustris* (*C. verna* L.) occurs in Victoria only, not, as hitherto recorded, in New Zealand and widely in Australia. *C. stagnalis* Scop. and *C. hamulata* Ktzg. are adventives in Australia and New Zealand, and *C. heterophylla* Pursh emend Darly in New Zealand.

C. petriei subsp. *petriei* is the first dioecious taxon found in the genus.—[Author's summary.]

269→ UMBELLIFERAE. Bell, C. R. & Constance, L., 1960, Chromosome numbers in Umbelliferae, 2, *Amer. J. Bot.*, **47**, 24-32.

319. EUPHORBIA. Shimoyama, S., 1959, Cytological studies in the genus Euphorbia, 3, *Ann. Rep. Nat. Inst. Genetics*, Japan, **9**, 51-53. The following chromosome numbers are reported:—*Euphorbia peplus* $2n=16$, *E. cyparissias* $2n=20$, *E. stricta* $2n=20$, and *E. marginata* $2n=56$.—[D.H.K.]

320. POLYGONUM. Witts, K. J., 1960, The germination of Polygonum species in the field and in the glass house, *J. Ecol.*, **48**, 215-217.

320/9. POLYGONUM PERSICARIA L. Doida, Y., 1959, Developmental studies in the genus Polygonum, 1. Microsporogenesis in Polygonum persicaria, *Ann. Rep. Nat. Inst. Genetics*, Japan, **9**, 58-59.

322/1. KOENIGIA ISLANDICA L. Ratcliffe, D., 1960, Koenigia islandica in Mull, *Trans. & Proc. Bot. Soc. Edinb.*, **39**, 115-116.

322/1. KOENIGIA ISLANDICA L. Ratcliffe, D., Koenigia islandica in Scotland—Corrigendum, *Trans. & Proc. Bot. Soc. Edinb.*, **39**, 116.

325. RUMEX. Harper, J. L. & Chancellor, A. P., 1959, The comparative biology of related species living in the same area, 4. Rumex: interference between individuals in populations of one and two species, *J. Ecol.*, **47**, 679-695.

330. ULMUS. Richens, R. H., 1959, Studies on Ulmus, 3. The village elms of Hertfordshire, *Forestry*, **32**, 138-154. A biometrical study of the elms of southern Cambridgeshire was published in *Forestry*, **31**, 132. The present paper is a parallel study of the village elms of Hertfordshire. The number of samples collected was 143. For each of these 8 quantitative and 1 qualitative foliar characters were determined. The majority of the samples fall into 9 biometrically defined groups, 7 pertaining to *Ulmus carpinifolia* and 2 to *U. procera*. *U. glabra* was also encountered and one putative hybrid between *U. glabra* and *U. carpinifolia*.

The *U. carpinifolia* elms occur in the east of the county and appear to be of Roman introduction in at least one instance. Of the 2 groups of *U. procera*, one with short petioles and low basal asymmetry is centred around St. Albans. The other group with longer petioles and conspicuous basal asymmetry, appears to have entered the county both from the Icknield zone in the north and from Middlesex in the south. Both groups of *U. procera* were established by the end of the Middle Ages, but their introduction into the county has not yet been closely dated.—[Author's summary.]

330. ULMUS. Richens, R. H., 1960, Cambridgeshire elms, *Nature in Cambs.*, **3**, 18-22.

336/1. ALNUS GLUTINOSA (L.) Gaertn. McVean, D. N., 1959, Ecology of Alnus glutinosa (L.) Gaertn. 7. Establishment of Alder by direct seeding of shallow blanket bog, *J. Ecol.*, **47**, 615-618.

341. QUERCUS. Hadfield, M., 1960, Random notes on British oaks, *Quart. J. For.*, **54**, 141-145. The heavy fruiting during 1959 of *Quercus robur* L. and *Q. petraea* (Matt.) Liebl. in the Midlands and East Anglia (but not in certain hill oak woods in west and central Wales) is remarked upon. With the unusual presence of acorns on both species to confirm identifications, an attempt is made to differentiate in broadest terms between the two species and define hybridity. In the light of this searches were made in Streetly Wood, Warwickshire, and Mains Wood, Herefordshire, where the two species grow together, to find hybrids. Arising out of this, the enormous variation in leaf blade size and shape within one population is remarked upon, and the conclusion reached that hybrids are extremely rare. It is suggested, however, that cut-leaved oaks and the Cypress Oak, usually described under *Q. robur*, are in fact of hybrid origin.—[Author's summary.]

341/3. QUERCUS ROBUR L. Izdebski, K., 1959, Wstepne badania nad ekologia i rozmieszczenium debu szypulkowego (Quercus robur L.) w Polsce, *Ann. Univ. Mariae Curie, Sect. C., Biol.*, **11**, 415-506, Preliminary studies on the distribution of *Quercus robur* in Poland.—[D.H.K.]

349. Daboecia. Stelfox, A. W. & Wood, P. W., 1960, What is the origin of the heath Daboecia cantabrica var. praegerae?, *Irish Nat. J.*, **13**, 121-122. *Daboecia cantabrica* "var. *praegerae*" is reputed to have been found growing wild in Connemara by Mrs. Praeger, and was later sent to the Slieve Donard Nursery. Although the plant is known in cultivation its original wild habitat has never been refound.

D. cantabrica "var. *praegerae*" possesses certain characters which resemble *D. azorica* Tutin & Warburg, and the authors suspect that it may be a hybrid between that species and *D. cantabrica*. As *D. azorica* has not been recorded from Ireland it is important that the original locality for *D. cantabrica* "var. *praegerae*" should be rediscovered in order that the authors' theory may be confirmed.—[D.H.K.]

364. Empetrum. Löve, A. & D., 1959, Biosystematics of the Black Crowberries of America, *Canad. J. Genetics & Cytology*, **1**, 34-38. The collective species *Empetrum nigrum* consists of the two species *E. nigrum* s. str. and *E. hermaphroditum*. Besides morphological and geographical dissimilarities, these species differ in chromosome number, the former being diploid and the latter tetraploid. It is demonstrated that although the species *E. nigrum* is most frequently included in American floras, populations from this continent are tetraploid and hermaphrodite and, thus, more correctly named *E. hermaphroditum*.—[Authors' summary.]

364. Empetrum. Favarger, C., Richard, J.-L. & Duckert, M.-M., 1959, La Camarine noire Empetrum nigrum et Empetrum hermaphroditum en Suisse, *Bull. Soc. Bot. Suisse*, **69**, 249-260. The history and distribution of these two species are outlined, with details of their occurrence in Switzerland. Distribution of the sexes is generally related to chromosome number; *Empetrum hermaphroditum* is the species of the Alps and southern Jura and *E. nigrum* sensu stricto of the central Jura.—[E.B.B.]

367. Primula. Crosby, J. L., 1959, The elucidation of a problem in Primula evolution by means of the electric computer, *Proc. 10th Intern. Congr. Genetics*, **2**, 61.

367/3. Primula veris L. McMillan, N., 1960, The cowslip at Bellahill, Co. Antrim, *Irish Nat. J.*, **13**, 125.

372/4. Anagallis minima (L.) E. H. L. Krause. Morariu, L., 1956, Geobotanische und chorologische Daten über die Art Centunculus minimus L., *Studii si cercetări biol. Acad. RPR Fil. Cluj.*, **7**, 79-84.

379/1. Vinca minor L. Vivien, J., 1959, La pervenche lie-de-vin en forêt de Fontainebleau, *Bull. Ass. Nat. Loing*, **36**, 11. A wine-coloured variety of *Vinca minor* is recorded from Mt. Pierreux.—[E.B.B.]

388. Polemonium. Klokov, M., 1955, Polemonia Eurasiatica, *Not. Syst. Herb. Inst. Bot. Nom. V.L. Komarovii Acad. Sci. U.R.S.S.*, **17**, 273-323.

410. Atropa. Pascher, A., 1960, Über Atropa, *Flora*, **148**, 84-109.

413. Solanum. Lawrence, G. H. M., 1960, The cultivated species of Solanum, *Baileya*, **8**, 21-35. Gives a key to the identification of the species of *Solanum* known to be in cultivation, and provides a number of interesting notes.—[D.H.K.]

413/3. SOLANUM NIGRUM L. Rai, U. K., 1959, A 40-chromosome variant in Solanum nigrum L., *Nature*, **184**, 1587.

413/5. SOLANUM TRIFLORUM Nutt. Londo, G., 1959, Solanum triflorum Nutt. in de duinen tussen Hoogovens en Noordpier, *Correspondentieblad*, **14**, 147-148.

415/1. DATURA STRAMONIUM L. Gibby, A. N., 1959, The Thorn Apple in Durham City, *Vasculum (Subst.)*, **44**, 30.

415/1. DATURA STRAMONIUM L. Lynn, J., 1960, Datura stramonium L., Thorn Apple, in Northern Ireland, *Irish Nat. J.*, **13**, 107-111.

418. ANTIRRHINUM. Harrison, B. J., 1960, Autonecrosis in Antirrhinum species hybrids, *Ann. Rep. John Innes Hort. Inst.*, **50**, 22.

425. MIMULUS. Vickery, R. K., Junr. & Moukerjee, B. B., 1959, Cytogenetic studies of the patterns of evolution in the Mimulus guttatus complex, *Proc. 10th Intern. Congr. Genetics*, **2**, 301-302.

425/1. MIMULUS GUTTATUS DC. Vickery, R. K., Junr., 1959, Barriers to gene exchange within Mimulus guttatus (Scrophulariaceae), *Evolution*, **13**, 300-310.

429. DIGITALIS. Schwanitz, F., 1957, Spornbildung bei einem Bastard zwischen drei Digitalis-Arten, *Biol. Zentralbl.*, **76**, 226-231.

429. DIGITALIS. Werner, K., 1960, Zur Nomenklatur und Taxonomie von Digitalis L., *Bot. Jahrb.*, **79**, 218-254..

430. VERONICA. Yamazaki, T. & Takeota, T., 1959, Cytotaxonomic studies in Veronica and related genera, *Ann. Rep. Nat. Inst. Genetics*, Japan, **9**, 54.

430/3. VERONICA CATENATA Pennell. Ooststroom, S. J. Van & Reichgelt. T. J., 1958, De vruchtgal op Veronica catenata Pennell, *Correspondentieblad*, **7**, 81-82.

433. RHINANTHUS. Kunz, H., 1959, Bemerkungen zu einigen Rhinanthus-sippen, *Phyton*, **8**, 243-258.

439/2. LATHRAEA CLANDESTINA L. Nelson, G. A., 1959, Lathraea clandestina L. at Askham Richard, v.c. 64, S.-W. Yorks., *The Nat.*, **1959**, 127-128.

445. MENTHA. Murray, M. J., 1959, Evolution in the genus Mentha, *Proc. 10th Intern. Congr. Genetics*, **2**, 201-202.

447/1. ORIGANUM VULGARE L. Sharygina, I. S., 1959, Certain problems of biology and biochemistry of Origanum vulgare, *Bot. Zhurn.*, **44**, 1124-1128 (in Russian).

456. MELITTIS. Klokov, M., 1957, Conspectus Generis Melittis L., *Not. Syst. Herb. Inst. Bot. Nom. V.L. Komarovii Acad. Sci. U.R.S.S.*, **18**, 183-217.

460. BALLOTA. Lawalrée, A., 1959, Revision des Ballota de Belgique de l'herbier du Jardin Botanique de l'Etat, *Bull. Jard. Bot. Brux.*, **29**, 307-311. Examination of the herbarium of the State Botanic Garden of Brussels shows that the majority of Belgian specimens of *Ballota* belong to *B. nigra* subsp. *foetida*, a few only being referable to *B. nigra* subsp. *nigra*. The latter is said to be adventive only, as in

the British Isles; the former is given as occurring in the north of the British Isles. Characters distinguishing the two are:—

Calyx-teeth erect/erect-spreading, triangular-lanceolate/subulate-lanceolate, long attenuate to apex, 3-6 mm. .... *B. nigra* subsp. *nigra*.
Calyx-teeth ± spreading at maturity, broadly oval/semi-circular, obtuse, and abruptly acuminate-mucronate at apex, 1·5-3 mm. long ....
B. nigra subsp. *foetida*.

—[E.B.B.]

481→ Rubiaceae. Wagenitz, G., 1959, Die systematische Stellung der Rubiaceae. Ein Beitrag zum System der Sympetalen, *Bot. Jahrb.*, **79**, 17-35.

485. Galium. Piotrowicz, M., 1959, Badania kariologiczne nad niektórymi gatunkami z redzaju Galium L., *Acta Biol. Cracov., Sér. Bot.*, **1**, 159-169. Karyological studies on *Galium* in Poland has revealed two chromosome races of *G. mollugo*, $2n=22$ and $2n=44$, the latter is distributed over the whole of Poland. The former is rarer but widely distributed.—[D.H.K.]

485/3b. Galium mollugo subsp. erectum Syme. Shaw, H. K. Airy, 1960, On the identity and nomenclature of Galium erectum Huds., *Kew Bull.*, **14**, 63-65. The name *Galium erectum* Huds. is untenable in its current application and the correct name for the taxon maintaining it in the rank of a species appears to be **G. capsiriense** Jeanbert ex Timbal-Lagrave, 1883.

Some authors, however, regard the taxon as a subspecies of *G. mollugo* and here it can be legitimately referred to as *G. mollugo* subsp. *erectum* Syme.

The whole complex of forms included in *G. mollugo* is in need of taxonomic revision.—[D.H.K.]

487/3. Sambucus racemosa L. Vopravil, B., 1960, Sambucus racemosa var. laciniata Koch, *Preslia*, **32**, 100-101.

493/1. Adoxa moschatellina L. Holt, O., 1960, Flower like an old clock tower, *Country Life*, **127**, 1373.

503. Galinsoga. Jallu, J. & Jovet, P., 1959, Les Galinsoga aristulata Bickn. et G. parviflora Cavan à Bayonne, *Bull. Cent. Etud. Rech. Sci. Biarritz*, **2**, 347-349. Both species of *Galinsoga* were discovered in 1955 in Bayonne in the grounds of the Technical College. In 1958 the habitat was destroyed but *G. parviflora* was found in two other localities.—[E.B.B.]

503/2. Galinsoga ciliata (Raf.) Blake. Cavaillé, A., 1959, Le Galinsoga aristulata Bickn. à Montauban, *Bull. Cent. Etud. Rech. Sci. Biarritz*, **2**, 345. A short note on the discovery of *G. aristulata* (=*G. ciliata*) near Montauban in 1953 and its subsequent spread; some associated species are noted.—[E.B.B.]

503/2. Galinsoga ciliata (Raf.) Blake. Touton, J. B. & Coquillat, M., 1960, Renseignements systématiques at géographiques à propos de l'apparition de Galinsoga aristulata Bickn. en Bresse, *Bull. Soc. Linn. Lyon*, **29**, 13-24. Following the appearance of *Galinsoga aristulata* [=*G. ciliata*] in 1958 at Replonges (Ain) a study has been made of its introduction and spread. The reason for rejecting "*ciliata*" as the specific epithet is the doubt attached to Rafinesque's work.

A key is given to distinguish the species from *G. parviflora* [this adds nothing to the differences outlined in British literature, to which no reference is made]. A suggested means of introduction, which was much later than that of the allied species, is with imported bananas, and various means of spread are noted, e.g. wind, water, grain, pot-plants. A map showing the distribution of the species in France is supplied.—[E.B.B.]

503/2. GALINSOGA CILIATA (Raf.) Blake. Wanless, J. W., 1959, The gallant soldier, Galinsoga ciliata (Rafn.) Blake, in Northumberland, *Vasc.* (*Subst.*), **44**, 22.

528. ACHILLEA. Spudilova, V., 1957, A monographical study in the genus Achillea in Czechoslovakia, 4, *Acta rer. nat. distr. Ostrav.*, **18**, 101-106: **5**, *loc. cit.*, 190-199.

533/2. CHRYSANTHEMUM LEUCANTHEMUM L. Favarger, C., 1959, Distribution en Suisse des races chromosomiques de Chrysanthemum leucanthemum L., *Ber. Schweiz. Bot. Ges.*, **69**, 26-46. Three chromosome races of the aggregate species *Chrysanthemum leucanthemum* L. *sensu lato* are recognisable from many counts of Swiss material: *C. leucanthemum* L. *sensu stricto*, diploid with two subspecies—subsp. *praecox* and subsp. *alpicola*; *C. ircutianum* Turcz., tetraploid; *C. montanum* Allioni, hexaploid. A fourth species, *C. heterophyllum*, octoploid will probably have to be separated eventually.—[E.B.B.]

537/1. CARLINA VULGARIS L. Meusel, H. & Köhler, E., 1960, Die Blattbildung von Carlina vulgaris L., *Bot. Jahrb.*, **79**, 192-207.

539. CARDUUS. Moore, R. J. & Mulligan, G. A., 1959, A study of natural hybridization between Carduus acanthoides and Carduus nutans, *Proc. 10th Intern. Congr. Genetics*, **2**, 193.

544. CENTAUREA. Tzelev, N., 1959, Notulae criticae de sectionibus nonnullis generis Centaurae L., *Not. Syst. Herb. Inst. Bot. Nam. V.L. Komarovii Acad. Sci. U.R.S.S.*, **19**, 409-441.

544/6. CENTAUREA NIGRA L. Nordhagen, R., 1959, Hører Centaurea nigra L. til Norges ville flora eller ikke?, *Blyttia*, **17**, 7-22.

556. SONCHUS. Shumovich, W. & Montgomery, F. H., 1956, The perennial sowthistles in north-eastern North America, *Canad. J. Agr. Sci.*, **35**, 600-605.

570. ELODEA. Sell, Y., 1959, Etude comparative de quelques espèces du genre Elodea à propos de l'apparition à Strasbourg et ses environs d'une espèce nouvelle pour l'Europe continentale, *Bull. Ass. Philomathique Alsace Lorraine*, **10**, 121-133. An account of the discovery of *Elodea callitrichoides* in 1958 in and around Strasbourg. A detailed description is given to which that given by Kent (1955, *Proceedings B.S.B.I.*, **1**, 321) is said to be analogous. Close study reveals that this species is distinct and not a form of *E. chilensis* as thought by Caspary. Apart from the British Isles, this is the first record for Europe and differences are tabulated between *E. callitrichoides* and other species recorded for Europe, viz. *E. canadensis* and *E. densa* [*Egeria densa*]; owing to its affinity with *E. chilensis*, differences are also tabulated for this species, not yet recorded for Europe but possibly to be found in the future. Two potential methods of introduc-

tion are discussed by maritime or river transport, across the North Sea and up the Rhine; or, more likely, by aquarists as suggested by Kent for the British Isles. The paper is illustrated by photographs and diagrams and the following key is given:—

1. Single bud-scale enclosing base of young branches; marginal teeth of leaves clearly visible to naked eye (not recorded in our area). Poland .... *Hydrilla verticillata* Casp.
1. Two bud-scales at base of young branches; marginal teeth of leaves not visible to naked eye:
    2. Leaves short, c. 1 cm., usually in whorls of 3 (opposite at base of branches —floral verticil of 4 lvs.); female flower with stigmas not deeply bifid, filiform or slightly notched; male flower not known from Europe. (In all our waters) .... *Elodea canadensis* Rich.
    2. Leaves longer from 1-3 cm., in whorls of 2-8; female flower not found or with stigmas deeply bifid to base; male flower not found or in threes (or more) in a spathe:
        3. Bud-scales lateral; leaves in whorls of 2-4; female flowers only so far found in Europe (male flower single, in a long, tubular spathe):
            4. Leaves short, less than 15 mm. long, 3-3·5 mm. broad, usually in whorls of three (2 at branch bases; floral verticils of 4). Denser habit (not yet recorded for Europe. Chili, Peru) .... *E. chilensis* (Planch.) Casp.
            4. Leaves usually more than 15 mm. long, not so broad (2-2·5 mm.), always in whorls of 3 (2 at base of branches; floral verticils of 3); habit less dense (England. Strasbourg in the Ill and adjoining rivers) .... *E. callitrichioides* (Rich.) Casp.
        3. Bud-scales median. Leaves in whorls of 3-8. Male flowers only found so far in Europe, from 2-5 in a subcylindrical spathe. Very dense habit (Leipzig. Niers/Niederrh., Karlsruhe) ...... *Egeria densa* (Planch.) Casp.

—[E.B.B.]

573/1. SCHEUCHZERIA PALUSTRIS L. Moore, J. J., 1959, Scheuchzeria in Ireland, *Irish Nat. J.*, **13**, 102. Since Pollagh Bay, Offaly, the only Irish station for *Scheuchzeria palustris*, is to be used for peat production, specimens were taken and transplanted in two other bogs—Raheenmore Bog and Lough Roe Bog—in Offaly in June 1959. Details of the exact locations have been left at the Botany Dept., University College, Dublin. —[D.H.K.]

590/1. MAIANTHEMUM BIFOLIUM (L.) Schmidt. Vivien, J., 1959, Maianthemum bifolium en forêt de Fontainebleau, *Bull. Ass. Nat. Loing*, **35**, 117. This species, unrecorded for many years from the forest, was rediscovered in abundance in June 1959.—[E.B.B.]

591/1. ASPARAGUS OFFICINALIS L. Haigh, J. C., 1960, All-male Asparagus, *New Scient.*, **7**, 389-391.

594/1. FRITILLARIA MELEAGRIS L. Jongh, S. E. de, 1959, Fritillaria meleagris L., *Correspondentieblad*, **13**, 137-138.

598. ORNITHOGALUM. Faria, A. L. de, Sarvella, P. & Morris, R., 1959, Different chromomere numbers at meiosis and mitosis in Ornithogalum, *Hereditas*, **45**, 467-480.

600/1. ENDYMION NON-SCRIPTUS (L.) Garcke. Wilson, J. Y., 1959, Vegetative reproduction in the bluebell, Endymion non-scriptus (L.) Garcke, *New Phyt.*, **58**, 155-163. It is evident that the bluebell does reproduce vegetatively although less rapidly so than by seed. These conclusions are based upon observations during the dormant period which disclose the frequent presence of more than one bud in the bulb, on agreement in the morphological features of individuals within 'clumps' in nature, and on the successful production of clones from single transplanted bulbs. Other results of these studies include the confirmation of a large range of genotypic variation in flower colour and fruit shape, and the existence of teratology and polyploidy (triploidy) in the wild populations.—[Author's summary.]

606/3. LUZULA SYLVATICA (Huds.) Gaudin. See 675/16. POA CHAIXII Vill.

606/4. LUZULA LUZULOIDES (Lam.) Dandy & Wilmott. See 675/16. POA CHAIXII Vill.

606/8. LUZULA CAMPESTRIS (L.) DC. Câmara, A., Castro, D. & Wagner, M. Noronha-, 1959, Cytogenetics of accessory chromosomes in Luzula campestris DC., *Proc. 10th Intern. Congr. Genetics*, **2**, 41.

607. ALLIUM. Krochmal, A., 1960, Germination studies of aerial bulblets of Allium vineale L. and A. canadense L., *Amer. Midl. Nat.* **63**, 497-508.

607. ALLIUM. Sopova, M., 1960, Evolution in the genus Allium, *Ann. Rep. John Innes Hort. Inst.*, **50**, 10.

623/1. CYPRIPEDIUM CALCEOLUS L. Hardy, E., 1960, The Lady's Slipper Orchid in Britain, *Quart. Bull. Alpine Gard. Soc.*, **28**, 35-39.

628/1. LISTERA OVATA (L.) R.Br. 'C.R.', 1960, Abnormal plants of the Twayblade, *Vasc. (Subst.)*, **45**, 6. A number of plants of *Listera ovata*, with three leaves instead of the usual two, are reported from the Team Valley, Co. Durham.—[D.H.K.]

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640. OPHRYS. Soó, R., 1959, Ophrys-studien, *Acta Bot. Hung.*, **5**, 437-471.

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643/1. DACTYLORCHIS FUCHSII (Druce) Vermeul. Borsos, O., 1959, Dactylorchis fuchsii Druce et son affinité dans les flores hongroise et carpathique, *Acta Bot. Hung.*, **5**, 321-326.

650/4. LEMNA GIBBA L. Suneson, S., 1959, Lemna gibba i Bohuslän, *Svensk Bot. Tidsk.*, **53**, 287-292.

652/3. SPARGANIUM ANGUSTIFOLIUM Michx. Voo, E. E. Van der, 1959, Sparganium angustifolium Michx., *Correspondentieblad*, **13**, 143.

654→ CYPERACEAE. Mora, L. E., 1960, Beiträge zur Entwicklungsgeschichte und vergleichenden Morphologie der Cyperaceen, *Beitr. Biol. Pflanz.*, **35**, 253-341.

659/1. SCHOENUS NIGRICANS L. Bellamy, D. J., 1959, Occurrence of Schoenus nigricans L. on ombrogenous peats, *Nature*, **184**, 1590-1591.

663. CAREX. Langhe, J.-E. de, 1959, Notes sur quelques Carex de Belgique, *Bull. Jard. Bot. Brux.*, **29**, 299-305. A description is given of the variety *vikingensis* (C. B. Clarke) Gadec. of *C. distans* L. This is a more slender plant with narrower leaves and smaller in its parts than the type, from which it differs ecologically in preferring coastal rather than inland areas. Of the critical *C. flava* agg., five species occur in

Belgium: *C. flava* L., *C. lepidocarpa* Tausch, *C. demissa* Hornem., *C. serotina* Mérat and *C. pulchella* (Lönnr.) Lindm. The two last have been confused and the following differences are given:

C. serotina: female spikelets oval or spherical, less compact; utricles slightly swollen, less angular, 3 mm. long (beak 1 mm.); beak bidentate; side of bract-sheath opposite to limb not incised.

C. pulchella: female spikelets shortly cylindrical, very compact; utricles not swollen, with fairly well-marked angles on account of compact form of spikelet; 2-2·5 mm. long (beak 0·5 mm.) not toothed; side of bract-sheath opposite to blade ± deeply incised in V shape.

C. reichenbachii Bonnet and *C. argyroglochin* Hornem., the latter regarded by many authors as a variety of *C. ovalis* Gooden., are also noted.

[*C. pulchella* is referable to *C. scandinavica* E. W. Davies; see *Watsonia*, **3**, 66 (1953)]—[E.B.B.]

663. Carex. Langhe, J. E. de & Reichling, L., 1958, Carex vulpina L. et Carex otrubae Podp. (C. nemorosa Reb.) en Belgique et au Grande Duché de Luxembourg, *Bull. Soc. Nat. Luxemb.*, **61**, 29-62.

663. Carex. Nelmes, E., 1959, De Caricibus Britannicis Notae, 9, *Not. Syst. Herb. Inst. Bot. Nom. V. L. Komarovii Acad. Sci. U.R.S.S.*, **19**, 75-78. *Carex muricata* L. is stated to be a species of limestone and calcareous habitats while *C. pairaei* auct. occid. non F. Schultz is a plant of non-calcareous habitats. The author claims that, although closely allied to *C. muricata*, *C. pairaei* auct. is a distinct species; it is described as **C. bullockiana** sp. nov.

British exsiccata are cited for both *C. muricata* and *C. bullockiana*. —[D.H.K.]

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663. Carex. Vicioso, C., 1959, Estudio Monográfico sobre el género "Carex" en España, *Inst. Forestal de Investigaciones y Experiencias*, **30**, no. 79. Pp. 1-205.

670. Festuca. Wiinstedt, A. K., 1959, Noter om danske graesser. Festuca ovina-gruppen og Bromus mollis-gruppen, *Bot. Tidssk.*, **55**, 42-46. The taxonomic concept of the groups *Festuca ovina* L. and *Bromus mollis* L. has been made the subject of a closer study and certain points of nomenclature are discussed. The two central European species *Festuca guestphalica* Boenn. and *F. laevigata* Clairv. are shown to occur in Denmark.

In the *B. mollis* group the study has been concentrated on the var. *leptostachys* Pers. (var. *leiostachys* Fr.). It is highly probable that this taxon is a hybrid between *B. mollis* and *B. racemosus*. Since it is very often fertile it may well be correct to regard it as a distinct species, *B. glabratus* Lindgr.—[Author's summary].

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694/1. ARRHENATHERUM ELATIUS (L.) Beauv. ex J. & C. Presl.—See 190/2. MEDICAGO SATIVA L.

696/1. DESCHAMPSIA CĚSPITOSA (L.) Beauv. Lagutenko, N. V., 1959, Ecological characteristics of Deschampsia caespitosa (L.) P.B., the dominant species of the valley meadows in the Altai mountains, *Bot. Zhurn.*, **44**, 1593-1599 (in Russian).

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H.21, Dublin. Moore, J. J., 1960, A re-survey of the vegetation of the district lying south of Dublin (1905-1956), *Proc. Roy. Irish Acad.*, **61**, B1., 1-36. Part of the district lying south of Dublin, first surveyed by Pethybridge and Praeger (1905), has been resurveyed half a century later. Results are presented in a coloured map showing the newly-determined community boundaries and in a series of plant lists covering the chief communities in the district.

Pethybridge and Praeger's analysis of the vegetation is reviewed in the light of these results and of modern work dealing with the classification of Irish vegetation. Some of the phytosociological methods of Braun-Blanquet, and their application by Braun-Blanquet and Tüxen (1952) to Irish plant communities, are examined.

The status of *Eriophorum* and *Trichophorum* mountain blanket bog is examined and some of the factors which may account for their present distribution in the area surveyed are suggested.

The most striking changes noted are the widespread reduction in the frequency of *Rhacomitrium lanuginosum* and the rapid advance of *Pteridium aquilinum*, especially on to abandoned farmland. The maximum advance noted was 150 m. over the 50 years.

In general, it has been concluded that the communities have remained quite stable over the 50 years; that any notable changes may be traced to man's interference, but that once this has ceased, equilibrium of the vegetation is re-established very rapidly.—[Author's summary].

H.38, Derry, H.39, Antrim & H.40, Down. Carrothers, E. N. & Moon, J. McK., 1960, Notes on the flora of the north-east of Ireland, *Irish Nat. J.*, **13**, 118-120.

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ECOLOGICAL (See also TOPOGRAPHICAL)

Barkman, J. J., Kraft, H. Doing, Leeuwen, C. G. Van & Westhoff, V., 1958, Einige opmerkingen overde terminologie in vegetatiekunde, *Correspondentieblad*, **8**, 87-93.

Bournerais, M., 1959, Le peuplement végétal des espaces nus. (Essais expérimentaux sur la genèse de divers groupements pionniers), *Bull. Soc. Bot. France, Mem.*, 3-300. A detailed comparative study of several bare areas near Fontainebleau, including some experimental sites set up by the Laboratory of Vegetable Biology. Floristic differences in the subsequent colonisation are analysed and discussed.—[E.B.B.]

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Fröde, E. T. 1959, Die Pflanzengesellschaften der Insel Hiddensee, *Wiss. Zeitschr. Ernst Moritz Arndt-Univ. Griefswald*, **1957-58**, 277-305.

Gehu, J.-M., 1959, Caractères et affinités des prairies permanentes de l'Avesnois, *Bull. Soc. Bot. France*, **106**, 248-256. A study of the different types of permanent meadowland in this area of northern France; two main categories are analysed—hygrophilous meadows and mesophilous meadows.—[E.B.B.]

Gehu-franck, J., 1959, Rapports sol/végétation dans quelques stations basiques du Boulonnais, *Bull. Soc. Bot. France*, **160**, 243-247. Examples are given of several natural sites in the Boulonnais area which reveal the close relationship between soil and vegetation.—[E.B.B.]

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Belgium: *Acerato-Tilietum*, *Ulmeto-Aceratum* and on outcrops of quartzite and Sandstone *Dryopterideto-Aceratum*. These three associations are described and analysed by floristic lists.—[E.B.B.]

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SCHOFIELD, W. B., 1959, The salt-marsh vegetation of Churchill, Manitoba, and its phytogeographic implications, *Nat. Mus. Canad. Bull.*, **160**, 107-132.

SUKOPP, H., 1960, Vergleichende Untersuchungen der Vegetation Berliner Moor, *Bot. Jahrb.*, **79**, 127-191.

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A short account is given of the changes in plants observed during the last 4 years since the advent of myxomatosis and the virtual disappearance of rabbits. These changes were observed by repeated records of point-quadrats at intervals along a series of fixed transects in places where rabbits had been abundant. The total length of the transects was nearly 5 miles (8 km.) and the number of point-quadrats, most of which were recorded twice a year, was about twelve thousand.

After the death of the rabbits, the turf increased in height and there was a spectacular increase in the abundance of flowers, especially of orchids, in some places. But already there is an indication that in the absence of grazing the turf may lose its density, and possibly its botanical interest, as some plants—even the grasses—show a tendency to decrease in quantity.

There has been an increase of woody plants. Brambles have grown greatly, and so have gorse bushes; their seedlings and those of many other woody plants are becoming much more common in grasslands and in woods. *Calluna vulgaris* is appearing in places where, owing to close grazing, its presence was not evident before.

As it is only a short time since the rabbits have died, and as some changes already are being reversed, this event of major ecological importance merits careful observation and record. For it is possible that the course of plant succession observed in the presence of rabbits differs from the succession in their absence.—[Author's summary.]

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Dupont, P. & S., 1959, Additions à la flore du Norde-Ouest de l'Espagne, 2, *Bull. Soc. Hist. Nat. Toulouse*, **94**, 262-272. A list of new or rare species, including five pteridophytes, in four provinces of Galicia. Interesting distributional notes are given, particularly for *Erica mackaiana* Bab. and *E. vagans* L. *Isoetes histrix* is given as new to the province of La Coruña.—[E.B.B.]

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Julin, E., 1960, Säivis-Bredviken en märklig bottnisk växtlokal, *Bot. Not.*, **113**, 20-28. Säivis-Bredviken (Parish of Nedertornea, Province of Norrbotten, north-eastern Sweden) is a rectangular inlet which cuts deeply into a projecting part of the coast of the Gulf of Bothnia. The inner part of the inlet is very shallow. Storms cause water to rush into the inlet and violently change the inner shore with its shoals of sand. The shoals and the shores thus become a good germinating-bed for diaspores of foreign species which are feeble in competition, and which are caught by the inlet from the seadrift. Vegetation and flora are described.—[Author's summary, p.p.]

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Khoshoo, T. N., 1959, Polyploidy in gymnosperms, *Evolution*, **13**, 24-39.

Kientzler, L., 1959, Une nouvelle station de plantes halophiles en Lorraine, *Bull. Soc. Sci. Nancy*, **80**, 339-341. Along the course of the Meurthe at Varangéville, the chemical waste from the soda factory established twenty years ago has created a salt-marsh habitat for halophytic plants, e.g. *Aster tripolium*, *Salicornia herbacea*, *Spergularia marina* and *Triglochin maritimum*.—[E.B.B.]

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McClintock, D., 1960, Alien lawn weeds, *J. Roy. Hort. Soc.*, **85**, 276-280. An account of the alien species, mostly rock garden plants, which have occurred in Britain as pests of lawns. *Veronica filiformis*, *Cotula dioica* and *C. squalida* are widespread, but *Epilobium nerterioides* is less common. *Hydrocotyle moschata* is known from a lawn at Tunbridge Wells and *H. rotundifolia* from the golf course at Largs, Ayrshire. *Pratia angulata* occurs in turf at the Royal Botanic Garden, Edinburgh, and on a lawn at Keston, Kent, while *P. arenaria* is reported from a lawn at Branksome, Dorset. *Nertera granadensis* flourishes on lawns at Rhu, Dunbartonshire and Harrogate, Yorkshire.

Attention is drawn to a pentamerous *Sagina* species, which may be *S. glabra* or *S. pilifera*, which is known from a lawn at Tunbridge Wells, and is planted on graves in cemeteries from whence it spreads to paths and lawns. *Helxine soleirolii* is recorded from lawns in Devon and Hunts.

Other species which may be detected in lawns are *Androsace sarmentosa*, *Oxalis corniculata*, *Linaria hepaticifolia*, *Mentha reguienii* and *Selliera radicans*.—[D.H.K.]

MANSFIELD, R., 1959, Vorläufiges Verzeichnis landwirtschaftlich oder Gärtnerisch kultivierter Pflanzenarten, *Die Kulturpflanze*, Beih. 2, i-v, 1-659.

MELVILLE, R., 1960, A metrical study of leaf-shape in hybrids, 1. The leaf-shape of some F_1 hybrids and their parents, *Kew Bull.*, **14**, 88-102.

MICHAELIS, P., 1959, Cytoplasmic inheritance and the segregation of plasmagens, *Proc. 10th Interm. Congr. Genetics*, **1**, 375-385.

OUREN, T., 1959, Om skipsfartens betydning for Norges flora, *Blyttia*, **17**, 97-118. The influence of shipping on the flora of Norway is reviewed. Between 1838 and 1895 many Norwegian vessels discharged ballast, i.e., stone, sand, gravel, etc., near, or in, the port of loading. The ballast often contained seeds of foreign plants, and is undoubtedly responsible for the introduction of a number of adventive species which have now become naturalised, e.g., *Matricaria matricarioides* and *Carduus tenuiflorus*.

The most important localities for the occurrence of alien species over the last century are shown by means of a map.—[D.H.K.]

PERRING, F. H., 1960, Mapping the distribution of British flowering plants, *New Scient.*, **7**, 1522-1525.

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SAVILLE, D. B. O., 1959, Limited penetration of barriers as a factor in evolution, *Evolution*, **13**, 333-343.

SIRKS, M. J., 1959, Lamarck on the "inheritance of acquired characters", *Genetica*, **30**, 391-392.

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STEBBINS, G. L., 1959, Seedling heterophylly in the Californian flora, *Bull. Research Council Israel, Sect. D., Bot.*, **7D**, 248-255.

SHORT NOTES

PLANT INTRODUCTIONS AT KEN WOOD, MIDDLESEX

Drosera rotundifolia and *D. intermedia* formerly grew on the great bog behind Jack Straw's Castle, West Heath, Hampstead, but the former has been extinct for at least 50 years, while the latter has not been recorded since 1746.

I am informed that c. 45 plants of *D. rotundifolia* and c. 25 plants of *D. intermedia* have now been planted in West Meadow Bog, Ken Wood, Hampstead, the specimens being obtained from Thursley, Surrey. In the course of these transplantings a few specimens of *Erica tetralix* have been accidentally introduced; this species also grew at Hampstead, but has not been seen there since 1927.—D. H. KENT.

PLANT INTRODUCTIONS IN THE FOREST OF DEAN

In the *Journal of the North Gloucestershire Naturalists' Society*, Vol. **11**, No. **8** (August 1960), it is reported that 8 large plants and one seedling of *Sarracenia purpurea*, c. 20 plants of *Pinguicula grandiflora*, c. 10 plants of *P. vulgaris* and 2 plants of *P. lusitanica* were deliberately planted in a small bog in the Forest of Dean. The specimens were obtained from Ireland.—D. H. KENT.

SELF-SOWN CONIFERS

With reference to the notes by C. A. Stace on *Tsuga heterophylla* and *Chamaecyparis lawsoniana* (1960, *Proc. B.S.B.I.*, **4**, 40-41) I would like to make the following comments.

If it is suggested that the two saplings of *Tsuga heterophylla* in Kiln Down Wood grew from seed transported by natural means from the Pinetum, then I think it is highly improbable. The greatest distance *T. heterophylla* seedlings have been found from a mother tree in the Pinetum is about 275 metres. I think it is fair to assume that if seeds were dispersed to Kiln Down Wood, which is 3 kilometres from the Pinetum, then some plants could be expected to occur in Crouch's Wood, where conditions are similar to those in Kiln Down Wood, and which is some 400 metres nearer to the Pinetum; but none were found when the wood was clear-felled and prepared for replanting in the winter of 1959-60. I might add here that the season's planting consisted of a mixture of *Quercus petraea*, *Picea abies* and *Tsuga heterophylla*.

If, however, one is to assume that the saplings originated as *plants* from the Pinetum, then I think this is highly probable.

Apart from the natural seedlings that can be found in the Pinetum, since 1954, 64,000 plants of *T. heterophylla* have been imported into Bedgebury Forest, and it is quite likely that the plants originated "by some means or other" from the Forest.

Chamaecyparis lawsoniana seeds so freely, both in the Forest and the Pinetum, that a large number of natural seedlings are destroyed during normal forest operations.

At the Flimwell entrance to the Forest, an avenue of *C. lawsoniana* has produced self-sown plants in a plantation of *Pinus sylvestris*, which has an average top height of 12 metres. The plants range from 2 centimetres to 10 metres in height, up to about 25 metres from the avenue. On the opposite side of the avenue, seedlings have established themselves in *Castanea sativa* coppice. In the Pinetum, natural regeneration of *C. lawsoniana* has resulted in the establishment of seedlings under a group of *Pseudotsuga menziesii.*

Conifers, other than those listed by Dandy (1958, *List of British Vascular Plants*), which have been known to produce self-sown plants in the Pinetum are:—*Pinus nigra* var. *calabrica* Schneider, *P. strobus* L., *Picea mariana* Kuntze, *Thuja plicata* D. Don, *Abies grandis* Lindl., *A. procera* Rehd., *Chamaecyparis thyoides* Britton, Sterns & Poggenb., and *Larix leptolepis* (Sieb. & Zucc.) Gord.

Of the five non-native species listed by Dandy, four have produced self-sown plants in the Pinetum, they are *Pseudotsuga menziesii, Picea abies, P. sitchensis,* and *Larix decidua.*

Natural seedlings of *Pinus nigra* var. *calabrica* have been allowed to grow on in an amenity belt in the Forest and will be incorporated in the amenity scheme.

One seedling of *Picea omorika* Mast. was found in a Dunneman-type seed bed which had been sown with *Tsuga heterophylla* seed; the seed having been collected and extracted by me. Leaf litter from *P. omorika* formed the base of the seed bed, and the *P. omorika* seedling could have originated there.—W. J. Davies.

BOOKS RECEIVED

Humboldt, A. von. *Essai sur la Géographie des Plantes* (1807). Pp. xii + 13-35. *Additions à la Géographie des Plantes.* Pp. 153-155. Society for the Bibliography of Natural History: Sherborn Fund Facsimile No. 1. London. 1959. Price 10/-. A facsimile of Alexander von Humboldt's important work on plant geography.

Ross-Craig, S. *Drawings of British Plants*, Part xv. *Compositae* (1). Plates 1-28. G. Bell & Sons Ltd., London. 1960. Price 9/6. A continuation of this excellent series, covering genera from *Eupatorium* to *Galinsoga.*

FIELD MEETINGS, 1959*

MAY 16th to 18th, 1959. WELLS

Leader: A. J. WILLIS

The meeting was arranged to enable members to visit a variety of habitats in this interesting and floristically rich area of N. Somerset. Features of the ecology of the region, and in particular of the sites visited, were outlined in a series of talks during the evenings of the meeting. Some records were made in connection with the Distribution Maps Scheme.

SATURDAY, MAY 16th. BREAN DOWN, BERROW DUNES AND MARSH

The Carboniferous Limestone headland of Brean Down, well known for its rare plants, was particularly striking because of the flowering of *Helianthemum apenninum*, which was sufficiently abundant to give a white carpet to large areas of the south-facing rocky slopes. Seen associated with the rock-rose were *Koeleria vallesiana* (especially in the rock crevices and small ledges) and *Carex humilis*, of which fruits were found. These three rare plants make up a substantial proportion of the vegetation of the southern steep slopes of the Down, although many other plants characteristic of limestone grassland are also present. *Trifolium ornithopodioides*, *Orobanche hederae*, *Ranunculus parviflorus* and *Carduus tenuiflorus* were all flowering, as was *Tragopogon porrifolius* near the foot of the Down.

The sand dunes at Berrow yielded a flora fairly typical of calcareous dune systems. On the dunes themselves a number of grasses, including *Aira caryophyllea*, *Bromus mollis*, *Festuca rubra*, *Phleum arenarium*, *Poa subcaerulea* and *Vulpia membranacea*, were flowering; *Hippophaë rhamnoides* dominated some parts. In the slacks *Carex disticha* was locally abundant, accompanied by *C. divisa*, *C. flacca* and *C. nigra*; *C. acuta*, a small form of *C. riparia* and, in one slack, small plants of *C. paniculata* were also noted. *Sisyrinchium angustifolium* was seen flowering, not far from an area dominated by *Equisetum variegatum*.

The zonation in the salt marsh near Berrow Church was seen to be well defined. This site is of interest because of its rapidly changing character and the development of a fresh water marsh on the inland margin; the flora included *Juncus subulatus*.

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*Field Meetings arranged by the Committee for the study of the Scottish flora are indicated by †.

SUNDAY, MAY 17th. THE MENDIPS: CHEDDAR WOOD, VELVET BOTTOM AND PRIDDY POOL

Cheddar Wood was visited as a representative example of Mendip woodland, the large proportion of *Tilia cordata* being an important feature. The ground flora was seen to include *Rubia peregrina*, *Colchicum autumnale* (fruiting) and *Lithospermum purpurocaeruleum*, in flower profusely in the better illuminated parts of the wood. On the neighbouring rocky parts of Callow Hill *Sorbus anglica* and *S. aria* were both flowering, as were *Orchis ustulata* (an interesting new record for the area) and *Potentilla tabernaemontani* on the grassy slope. Other parts of the slope were seen to be considerably leached, supporting, for example, *P. erecta* and *Erica cinerea*.

On the grassy and rocky slopes near Velvet Bottom, just east of the Cheddar Gorge, *Carex montana* was seen in quantity, as well as the Mendip form of *Thlaspi alpestre*, *Arabis hirsuta*, *Coeloglossum viride* and *Cystopteris fragilis*. Some of these plants, together with *Botrychium lunaria*, *Ophioglossum vulgatum* subsp. *vulgatum*, *Thelypteris robertiana*, *Saxifraga hypnoides* and *Thalictrum minus* were also found in Velvet Bottom.

At Priddy the plant zonation in the pool formed by an artificial dam was examined. The adjoining lead-mine spoil heaps supported *Minuartia verna* and *Silene maritima*.

MONDAY, MAY 18th. SOMERSET PEAT MOORS

Nearly all the original surface of the peat moors in this area has been removed by peat cutting, and the present vegetation represents various stages in secondary succession. Near Sharpham a low-lying area of old peat cuttings, long since recolonised, was visited. Among the plants of the rhines were *Carex lasiocarpa*, *Hottonia palustris*, *Oenanthe aquatica*, *Utricularia minor* (flowering), *Veronica catenata* and *V. scutellata;* plants on the peat itself, here distinctly acidic in reaction, included *Dryopteris lanceolatocristata*, *Osmunda regalis*, *Thelypteris palustris*, *Cirsium dissectum*, *Drosera intermedia*, *D. rotundifolia*, *Platanthera bifolia*, *Pinguicula lusitanica* and the shrubs *Frangula alnus* and *Myrica gale*.

At a second site, near Shapwick, other species characteristic of the peaty Somerset Levels were found. Among these were *Carex demissa*, *C. rostrata*, *Eleocharis multicaulis*, *Scirpus fluitans*, *Peucedanum palustre*, *Sium latifolium*, *Stellaria palustris* and *Wahlenbergia hederacea*.—A. J. Willis.

†JUNE 12th to 15th, 1959. CASTLE DOUGLAS

Leader: Miss E. I. Biggar

Fourteen members attended this meeting, held in what proved to be a most attractive corner of Scotland, and in weather conditions which could not have been bettered. Miss Biggar, on whom we relied for local knowledge, had planned the journeys so that we should enjoy the greatest variety of scenery as well as plant-habitat, and so that the countryside all around the base should be well explored.

On Saturday morning we left Castle Douglas by the Kirkcudbright road, stopping just outside the town to admire *Rumex hydrolapathum* and *Glyceria maxima* at Carlingwark Loch, and at the same time to give some their first look at *Cicuta virosa*. A little further on a wet meadow near Hightae added *Dactylorchis purpurella*, *D. incarnata*, *Stellaria palustris*, *Carex diandra* and *C. vesicaria*.

The muddy estuary of the Dee near Tougland yielded quantities of *Cochlearia anglica*, *Oenanthe lachenalii* and *Eleocharis uniglumis*; then we moved on through Kirkcudbright to the coast at Brighouse Bay. Here for most of us there was something new: *Genista tinctoria* and, unexpectedly, *Linum anglicum* in fine flower, fruiting plants of *Astragalus danicus*, withered stems of *Hyoscyamus niger*, leaves of *Sanguisorba officinalis* and a little Eyebright previously determined as *Euphrasia occidentalis*. During the afternoon some members of the Dumfries and Galloway Natural History and Archaeological Society joined the party.

On the return journey to Castle Douglas two stops were made—a sallow swamp near Senwick produced *Carex lasiocarpa*, *C. paniculata*, *Schoenus nigricans* and three species of Orchidaceae, while in the ravine of the Dee at Tougland Old Bridge grew *Serratula tinctoria*; this must be one of its most northerly stations, and here it is accompanied by *Geranium sanguineum*, *G. lucidum* and *Galium boreale*.

On Sunday the route was by Glenlochar and Laurieston to Woodhall Loch; here we saw *Trollius europaeus*, *Lysimachia nummularia*, *L. vulgaris*, *Hypericum humifusum*, *Jasione montana* and *Lepidium heterophyllum*. Then on to New Galloway station and westward across some peaty ground with *Carex lasiocarpa* and *Ranunculus lenormandi*; even in this remote spot *Chaenorrhinum minus* has arrived on the railway track, but *Fragaria vesca*, in abundant ripe fruit, caused more excitement on this hot afternoon. The objective, Stroan Loch, proved worth the effort; within minutes we had seen *Subularia aquatica*, *Isoetes lacustris*, *Lobelia dortmanna*, *Scirpus fluitans* and *Drosera intermedia*, with *Meum athamanticum* close by.

Back at Laurieston, we diverged south-westward over the moor, down the Valley of the Fleet (with a sudden and wonderful glimpse of the Isle of Man across the hazy sea) to Gatehouse, then eastward by Twynholm and Tougland, where *Ranunculus sceleratus* was added to the list.

Monday was spent to the east of Castle Douglas. Near Haugh of Urr were *Daphne laureola*, *Impatiens parviflora* and *Geranium phaeum*, while *Geranium sanguineum* grew at Sandyhills Bay and *Luzula luzuloides* within the ruins of the old church at Buittle.

We were once again independent of public transport, and record our gratitude to those members whose cars were so readily made available; botanising from a Rolls Royce is an uplifting experience. To Miss Biggar our special thanks for arranging the programme and, in particular, for a memorable evening in the house and garden at Cobieton.—R. MACKECHNIE.

JULY 18th and 19th, 1959. PORTSMOUTH AND SOUTHSEA

Leader: A. W. Westrup

Most of the party met at Mayfield School, Southsea, on Friday evening, 17th July, to introduce themselves and to be shown slides, prepared by Col. E. Rooke, of orchids and other plants to be found in the Portsmouth area.

Saturday morning was spent on the Browndown Ranges at Gosport where most of the plants thought to have been recently destroyed by the army on a well-known neighbouring patch of shingle were found to be still flourishing. The most notable find was a good colony of *Geranium purpureum* subsp. *forsteri*. A visit to the adjoining marshland, remains of the old Gower Pond, yielded good stands of *Cladium mariscus* and *Calamagrostis canescens* and *C. epigejos*, and pink-flowered forms of both *Calystegia sepium* and *C. silvatica* were also seen.

The afternoon was devoted to the study of the grasses of Farlington Marshes, including *Polypogon monspeliensis*, × *Agropogon littoralis*, *Puccinellia* species, *Hordeum marinum* and *Parapholis strigosa*. Most of the party risked the mile-long walk across the mud-flats of the Binnes Islands to see the three species of *Zostera*.

On Sunday a car ride was arranged to Old Winchester Hill, via Purbrook Heath where *Epipactis palustris*, *Anagallis tenella* and *Dryopteris lanceolatocristata* were seen, and Rudley Mill, where the spikes, recently discovered, of *Gymnadenia conopsea* subsp. *densiflora* were found to have been picked. Picnic lunch was eaten and the show of chalk plants, including *Phyteuma tenerum* and *Juniperus communis*, admired. The meeting closed with a tea-party at The Hunter's Inn, Swanmore.

The party numbered 14 B.S.B.I. members, and about a dozen members of the Portsmouth and District Natural History Society attended the meeting, some kindly providing transport.—A. W. Westrup.

AUGUST 1st to 8th, 1959. BALA

Leader: Evan Roberts

A party of eight resident members, whose enthusiasm more than compensated for their number, was augmented on several days by the welcome company of Mrs. Mary Richards of Dolgellau, Mr. Peter Benoit of Barmouth and Mr. Evan Roberts, Nature Conservancy Warden Naturalist for Snowdonia, whose knowledge of particular localities greatly facilitated the search. The excursions were planned to cover areas of basic volcanic and limestone rock which form floristically rich oases in the rather uniform moorland flora of upland Merionethshire. A talk explaining this underlying theme was given by Dr. Brian Seddon, Nature Conservancy Regional Officer, in a meeting room improvised in the loft of a hotel outbuilding where the audience included one black and white tame rabbit whose botanical interests were primarily gastronomic.

During the week, a total of over seven hundred records was added in six ten-kilometre squares of which that covering the vicinity of Bala was distinguished by its possession of over four hundred species while, despite intensive working, two squares only just passed the two hundred mark.

The more interesting finds were *Galium uliginosum*, a new county record, and *Euphorbia amygdaloides*, confirmed in its hitherto only known Merionethshire station and discovered at a new one. *Viola lutea*, *Genista anglica* and, previously known mainly on the coastal dunes of the county, *Gentianella campestris* and *Coeloglossum viride*, were found in several new stations. The botanists from southern England remarked on the scarcity of species such as *Galium verum*, *Trifolium medium* and *Gnaphalium sylvaticum* but, on the other hand, were delighted by a first acquaintance with, for instance, *Sedum rosea*, *S. telephium*, *S. forsteranum*, *Circaea alpina*, *Asplenium viride*, and others.

The very favourable weather and the kindness of those members whose cars assisted in transporting the party contributed in no small way to the success of the meeting.—B. SEDDON.

†AUGUST 1st to 15th, 1959. ISLES OF LEWIS AND HARRIS

Leader: Miss M. S. CAMPBELL

LEWIS (1st to 7th AUGUST)

It was the first visit to the Outer Hebrides of all ten members who assembled in Stornoway to map the underworked areas of north and east Lewis, and we were grateful to Mr. Roderick McLeod, a local botanist who joined us, for much information about the country and also his offer of a car, which (together with two belonging to members) made the question of transport an easy one.

Mapping results were poor in much of the interior, which consists of large areas of peat-bog interspersed with numerous lochs. The flora of the latter was found to be rather monotonous, and the pleasure at first afforded by abundant *Lobelia dortmanna*, *Sparganium angustifolium* and *Nymphaea occidentalis* (varied occasionally by such plants as *Subularia* and *Deschampsia setacea*) soon began to pall. Only three species of *Potamogeton* were found, others perhaps choked out by the floating form of *Juncus bulbosus* which sometimes formed great mats of vegetation.

The coastal strip proved rather more rewarding, with *Ligusticum scoticum* and *Sedum rosea* a feature of the cliffs, and *Juncus balticus* and *Carex maritima* re-found near the Butt of Lewis. *Agropyron junceiforme* × *repens* occurred on the dunes. Drifts of mauve *Gentianella campestris* delighted members, being occasionally replaced by creamy *Gentianella amarella* subsp. *septentrionalis* with the parts of the flower nearly as often in fours as in fives. Orchids, a feature of the machair, were unfortunately mostly over, but *Dactylorchis fuchsii* subsp. *hebridensis* lingered on in some places, and *Listera cordata* and *Coeloglossum* were in full flower.

In contrast to the rest of the area, the Stornoway square was found to be comparatively varied, though even here common weeds of cultivation such as *Veronica persica* were apparently absent. The most attractive plant seen during the meeting, *Sibthorpia europaea*, was flowering profusely in the grounds of Lewis Castle, where it has been established for some years.

With the mapping completed, August 7th was proclaimed a "free day" and members enjoyed visits to a Harris tweed mill and a kippering factory, arranged through the kindness of Mr. McLeod.

In all, fifty-eight specimens of plants belonging to critical genera were collected during the Lewis meeting and forwarded afterwards to headquarters. It is hoped that some of the *Euphrasiae, Hieracia* and *Salices*, at least, may prove to be of interest.—U. K. DUNCAN.

HARRIS (8th to 15th AUGUST)

With a team already well drilled to the mapping discipline, the organisation of the week in Harris was an easy and pleasant task. Tarbert is one of the loveliest spots in the Outer Hebrides and was an ideal centre from which to work, even though we had only 2 cars to carry us.

The topography is, in contrast to the low-lying Lewis, very tortuous and reaches the surprising height of 2,600′ on Clisham. Much of the area is very difficult to reach, having no roads and no inhabitants; for example, one square in the S.E. near Eishken required 1½ hours driving over extremely poor roads, followed by a 2 hour walk, before it could be reached, and then it proved to be one of the poorest in the British Isles; just over 100 species seen in 5 hours in an area which included coastal rocks and salt marsh. Nevertheless, this excursion emphasised just how much the presence of many plants depends upon human influence. The endless blanket bog contained no more than 20 species, though *Carex pauciflora* was one of them, and its nature is underlined by the fact that we did not find *Carex demissa* until we visited some overhanging crags.

But this was not typical Harris. The scenery, in brilliant weather, was magnificent and the mountains brought many compensations. Clisham has a number of interesting species, including *Alchemilla alpina*, *Cardaminopsis petraea* and *Deschampsia alpina*—and in other areas the mountain flora descends conveniently low; for example *Carex bigelowii*, *Thalictrum alpinum*, *Saussurea alpina*, *Saxifraga oppositifolia* and *Oxyria digyna* were found at about 1000′ on the range of hills just above Tarbert.

The west coast, as on Lewis, was always exciting to visit, bringing an increase in base-loving species and stretches of golden unspoilt sand where *Blysmus rufus* was seen in the salt marshes behind. On one or two occasions parties visited off-shore islands—Scarp earlier in the week and, later, the legendary Scalpay. Everyone told us of the richness of Scalpay—its refrigerators, immersion heaters and cars —and, for a small island 3 × 1½ miles with only about 2 miles of road, the sight of half a dozen motor vehicles is somewhat surprising. One cannot honestly say that the flora is equally rich, but it had some interesting features—a bog full of *Carex limosa* and an east-facing cliff, with near-woodland developing, which included *Dryopteris aemula*.

The apparent uniformity was always being broken. *Schoenus* was common in the west, rare in the east, and *Myrica*, strangely patchy, was only abundant on the east side. Here, too, in a sluggish river valley were tussocks of *Carex lasiocarpa* and one stand of *Hypericum elodes*. *Alchemilla vulgaris* agg. is very rare and *A. glabra* was the only species found. Near Tarbert on flat but gently sloping rocks *Sagina subulata* occurred. Bladderworts and Butterworts were widespread with *Utricularia intermedia* and *Pinguicula lusitanica* as common as their more widespread relations. Pride of place in a week of bogs must undoubtedly be given to the finding of a colony of the Bog Orchis, *Hammarbya paludosa*, near Ullaval—a new plant for nearly all of us.

It is always agonising to have to tear oneself away from the Hebrides and, for those who left by sea, the agony was, on this occasion, only too real. But, even as they lay bunk-bound, they surely could not forget the glory of the days when we could see the whole of the coast from Cape Wrath to Barra, and the romantic evenings when we met in the Carpenter's Shop of the Harris Hotel round an old trestle table under the banner of the raised Antler and a bare 100 watt bulb—with tea to follow.

Thanks are due to all those who took part and worked so hard and enthusiastically to finish this, one of the most inaccessible and interesting parts of the British Isles—perhaps we may all meet again—on Papa Westray?—F. H. PERRING.

SEPTEMBER 5th and 6th, 1959. WISBECH

Leader: F. H. PERRING

It was not without hesitation that I suggested holding a meeting at Wisbech, which, although announcing itself as capital of the Fens, is set in some of the plainest countryside in the British Isles. My main hope, however, was that a few stalwarts would find time to investigate a part of Cambridgeshire hardly visited botanically in the past 100 years. Though many botanists have lived in Cambridge during those years, few have reached further north than Ely because communications are bad and the attraction of the chalk and the remains of the Fens which fringe it are so great. And yet, as I hope the wonderful party of 30 who made the pilgrimage will now agree, there is something unique about Fenland botany which makes a short visit well worthwhile.

Firstly, there is the challenge of finding anything at all. On looking at a 2½″ map of the area—one saw a maze of blue squares—the fields and ditches—unrelieved by red contour lines because for hundreds of square miles the altitude fails to rise above 25 feet. Yet gradually one learns to look for fields which are not surrounded by a ditch—here is a slight rise in the ground—just a few feet which indicates the mineral soil coming through the peat or silt—and here may be found a dozen plants not to be seen elsewhere.

On the Saturday morning and the whole of Sunday we set out in small parties to look at different 10 km. squares in the county to see what could be found. The arable fields in general have a number of species, local elsewhere in Britain, in great abundance: *Chenopodium ficifolium*, *Polygonum nodosum*, *Lamium hybridum* and *Galeopsis speciosa*. All these could be seen this autumn—and, besides the fields, the ditches are endless sources of possibility, varying in successional stages from bare mud to dense stands of *Carex riparia*. After the exceptional summer many had dried out and here, in several new localities, *Eleocharis acicularis* turned up. Near Thorney a ditch was found lined with *Scirpus fluitans*—only the second extant record in the county. Pride of place for ditch plants must, however, be given to the rediscovery at Newton of *Althaea officinalis*—not seen in the county for over 100 years. There had seemed no reason why it should have disappeared but there were hundreds of miles of ditch to follow in the search.

The main drainage channels of the Fens had not dried out and many contained *Nymphoides peltata*, the small yellow-flowered, 'fringed water-lily'; *Alisma lanceolatum* was also to be found occasionally, whilst *Butomus*, *Hydrocharis* and *Ceratophyllum demersum* turned out to be much commoner than had been previously recognised.

The best of these ditches and drains and some interesting marshland was undoubtedly seen on Saturday afternoon when we joined the Cambridgeshire and Isle of Ely Naturalists' Trust for a stroll through the "washes" from Walney suspension bridge through Norfolk into Cambridgeshire. Here is an area ½ mile wide by about 10 miles long, which is flooded in winter when the 'drains' on either side overflow. An earlier visit to the area had disclosed a fine plant of *Bidens cernuus* which had been thought extinct in the county, besides *Rumex palustris* and *Juncus compressus*. However, on this occasion, with many more eyes to search, we came across *Polygonum minus*, another plant which had not been seen anywhere recently, *Eleocharis uniglumis*, *Polygonum mite* and *Senecio* × *ostenfeldii*.

One of the most remarkable observations was made in the main drains of the washes near Welches Dam. It seems likely that one of A. Fryer's happiest hunting grounds for Potamogetons was rediscovered, one party finding at least 11 species and hybrids during the day, including *P. alpinus*, a new county record. Another notable discovery was that of *Alopecurus aequalis* in a marsh on an abandoned rifle range near Wisbech. It has never been reported from the north of the county before. *Lotus tenuis* was found at the spot and it is now clear that this is a species to look out for in the Fenlands.

But to leave the almost unnatural (for the Fenlands) natural vegetation for the much more usual waste places and rubbish dumps. *Senecio squalidus* now seems to be widespread, as are *Senecio viscosus*, *Sisymbrium orientale* and *Polygonum cuspidatum*. *Veronica filiformis* has not overlooked this corner of England and was found in Upwell Churchyard—though in v.c. 28 (W. Norfolk). Another N.C.R. was made in this section: *Polygonum sachalinense* thoroughly established round a fine pike-filled pond near Thorney.

As a side-line members collected bags of bryophytes from each square and in this way added considerably to the previously scanty knowledge of their group in the Isle of Ely. One find of *Ricciocarpus natans* at Horseway was outstanding.

There is still a great deal to find out about the Fenlands—but this meeting finally established that it has a flora which is uniform and characteristic. The similarity between one part and another is astonishing and the contrast with the south of the county constant. However, had we done no more than walk to the North Brink, to Peckover House, on Friday evening, we would have found Wisbech delightful for here was a distinguished Georgian House, the finest in a magnificent row, which we were graciously shown round by Mr. and Mrs. Munday, on behalf of the National Trust; and because of the fine weather and the enthusiasm of the party, the Wisbech meeting resulted in a very useful contribution being made to the new 'Flora of Cambridgeshire', and one for which the authors will always be grateful. Oh, yes! a week-end in Wisbech has many compensations.—F. H. PERRING.

SOUTH-WEST REGIONAL MEETING, 1960

The meeting, organised by Dr. A. J. Willis, was held in the Department of Botany, University of Bristol, on Saturday, 17th September, and was followed by a field meeting on 18th September.

On Saturday morning, when Dr. J. G. Dony took the chair, lectures were given by Professor E. W. Yemm, Dr. A. J. Willis and Dr. D. S. Ranwell, and at the afternoon session, when Professor E. W. Yemm was chairman, by Dr. L. C. Frost, Dr. E. W. Davies, and Dr. J. F. Hope-Simpson.

An exhibition was held during the evening.

Lectures

THE DEVELOPMENT AND ECOLOGY OF THE SALT MARSH AT BERROW

E. W. Yemm

Professor Yemm gave an illustrated account of the extensive development of coastal marshes on the mudflats at Berrow, N. Somerset, during the past fifty years. *Salicornia* spp. and *Puccinellia maritima* were the primary colonisers but were later overgrown by *Spartina townsendii*. In recent years a discontinuous line of *Agropyron* foredunes has built up along the seaward margin of the marsh, now affording considerable protection and limiting the penetration of tidal water.

The distribution of the chief plant communities and their relation to salinity and other conditions were studied in a detailed survey in 1959-60. Measurements of the salinity of ground water show that essentially fresh-water conditions now prevail in the inland parts of the marsh. Here, extensive beds of *Phragmites communis* have developed as well as other communities containing many fresh-water plants and in which *Carex extensa, Festuca rubra, Juncus gerardii* and *Oenanthe lachenalii* are conspicuous. Seaward, a transitional zone dominated by *Scirpus maritimus* can usually be recognised in which large seasonal fluctuations of salinity occur. *Spartina* dominates the outer parts of the marsh where relatively high salinity is maintained by periodic tidal flooding through drainage channels and breaches in the foredunes. The present phase of development can be regarded as a transition from salt marsh to fresh-water conditions of a dune marsh associated with the seaward extension of the dune system.

STUDIES ON *JUNCUS SUBULATUS**

A. J. Willis

The diagnostic features of this rush, recently added to the British list, were described, as well as its world distribution and the environmental conditions under which the plant exists in the salt marsh at

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*See *Watsonia*, **4**, 211-217 (1960).

Berrow. Here two colonies occur in a region where the salinity of the ground water may vary considerably (from c. 1·2% NaCl to almost fresh-water conditions). Experiments on the effects of salinity on germination and on the growth of the plant were considered. Germination is adversely affected by saline conditions; no germination was observed at salinities above 1·2%, whereas under fresh-water conditions there was a high percentage and rapid germination. The seeds were found to require light for germination. The effects of sodium chloride on growth were studied in pot cultures; plants supplied with a nutrient solution lacking sodium chloride made extensive growth initially as compared with plants receiving a similar solution containing additional sodium chloride. The latter plants, however, made good growth in the later stages. These results indicate that for establishment from seed the plant may require fresh-water conditions, but for good vegetative development subsequently may be favoured by a saline environment. The Berrow site satisfies these requirements and *J. subulatus* is now spreading in the marsh both vegetatively and by seed.

STUDIES ON *SPARTINA* MARSH IN SOUTH AND WEST ENGLAND

D. S. Ranwell

A brief account of the historical development of *Spartina* marsh in Britain was followed by details of current studies on the formation, growth and ultimate fate of *Spartina* marsh in selected areas of Bridgwater Bay in Somerset and Poole Harbour, Dorset. The seaward spread of *Spartina* on to unoccupied mudflats in Bridgwater Bay is being followed from annual air photographs with ground control. Accretion studies suggest that an increase of 3-4 cm. a year occurs regularly over most of this marsh. Measurements were given of the rate of successional change at the upper limits of *Spartina* marsh in Bridgwater Bay and Poole Harbour, both in the presence and absence of sheep grazing. Methods of controlling the spread of *Spartina* using herbicides, and the need for such control in conservation, were also considered in this illustrated lecture.

THE DISTRIBUTION OF *HERNIARIA CILIOLATA* MELDERIS

L. C. Frost

In his illustrated survey, Dr. Frost showed that *Herniaria ciliolata* is abundant at the Lizard, Cornwall, on cliff edges and faces and the slopes of coves from Coverack to Polurrian Cove. Here the plant grows on shallow brown-earth soils over hornblende- and mica-schists, serpentine and gabbro, but very rarely on blown sand of granite gneiss origin. It occurs in a number of different habitats which support floristically distinct communities. *H. ciliolata* is also found on the north coast of Guernsey and in Jersey at St. Brelade's Bay, typically in open short turf on old fixed dunes, but it is absent from the high granite cliffs on both islands. The restricted distribution of the species may be due to certain requirements, *viz.* southerly aspect, absence of prolonged waterlogging or desiccation, open habitats, maritime influence; to self-sterility since obligate out-breeding may restrict wide dispersal; and to its past history as a member of the "Lusitanian" flora. It is recorded for Alderney and plants morphologically referable to *H. ciliolata* occur for certain in Brittany. In Herb. Cantab. is a supposed specimen from Castlemaine Bay, Co. Kerry.

THE ECOLOGY AND DISTRIBUTION OF *ASPARAGUS OFFICINALIS* SUBSP. *PROSTRATUS*

E. W. DAVIES

The paper described the main taxonomic and cytogenetic differences between *Asparagus officinalis* subsp. *officinalis* and subsp. *prostratus* and indicated that they were worthy of specific rank. The former is tall and upright in habit, and diploid with $2n=20$, while the latter is stunted and prostrate, has a rather irregular meiosis, and is tetraploid with $2n=40$.

A distribution map of subsp. *prostratus* showed that this plant always occurs near the sea in the south-west, both in this country and in France and Spain. In all the British habitats the plant grows in similar plant communities, usually dominated by *Festuca rubra.*

AUTECOLOGY OF SOME RARE PLANTS OF THE LIMESTONE NEAR BRISTOL

J. F. HOPE-SIMPSON

Dr. Hope-Simpson outlined some investigations recently made by Mrs. Cynthia Campbell and Dr. Elizabeth Pring on several rare plants (*Arabis stricta*, *Geranium sanguineum*, *Helianthemum apenninum*, *Koeleria vallesiana*, *Linosyris vulgaris*, *Trinia glauca*, *Veronica spicata*) which have, on the whole, a southerly European distribution. Their British occurrence can be viewed on the hypothesis of relict survival from a wider distribution in, probably, the Boreal period. The absence of these plants now from apparently congenial habitats may be related to biological features which determine the limits of distribution ranges. *Geranium sanguineum*, *Linosyris vulgaris* and *Veronica spicata* revealed very poor natural establishment of seedlings; investigation of the causes was illustrated by reference to *G. sanguineum*, in which germination has rather exacting requirements for water and aeration. Experimental introductions of all seven species on rocky limestone sites have shown very low seedling establishment except of *Trinia glauca.* Where erosion is obvious, casualties tend to outnumber seedling replacements. Where erosion is less, there is greater competition or, if not, a danger of severe drought.

Exhibits

1. INVESTIGATIONS ON THE BERROW SALT MARSH

The exhibit illustrated the lecture given at the meeting. Maps and photographs were included of the marsh at various stages of its development, and the chief topographical features of the area at present were shown in maps based on observations made in 1959. The recent survey included a series of levelled traverses across the marsh as well as a study of water-levels. The water-table of the sand-dune system inland was demonstrated to be the typical dome shape, but the table slopes gradually downwards to seaward across the marsh. The distribution of the chief plant communities of the marsh in 1960 was also shown, together with measurements of the salinity of the ground water. These measurements, made at selected points in the marsh at about monthly intervals over a period of 18 months, demonstrated that salinities are very different in different parts; the inland areas of the marsh usually have almost fresh-water conditions (less than 0·05% NaCl) and are reached only by exceptionally high tides, whereas in the *Spartinetum* the salinity averages more than 1%. A strong correlation between plant distribution and salinity is evident.—E. W. YEMM and A. J. WILLIS.

2. *JUNCUS SUBULATUS* FORSK.

The exhibit illustrated the lecture given at the meeting. Herbarium specimens and living plants of *Juncus subulatus* from Berrow and from Portugal were displayed, and the results of germination studies shown. The effect of sodium chloride on growth was demonstrated by pot cultures.—A. J. WILLIS.

3. STUDIES ON THE DEVELOPMENT AND CONTROL OF *SPARTINA* MARSH

The exhibit supported the lecture on this subject and showed:—

a. An attempt to measure the rate of spread of *Spartina* using aerial photographs.
b. A graph illustrating accretion measurements.
c. Colour transparencies of the more important species known to be actively invading *Spartina* marsh in the study areas.
d. Charts showing measurements of a changing *Scirpus maritimus*/*Spartina* boundary.
e. Photographs illustrating sheep grazing and herbicide experiments on *Spartina* marsh.—D. S. RANWELL.

4. VARIATION IN *HERNIARIA CILIOLATA* MELDERIS

Transplant experiments were demonstrated involving 29 plants from the Lizard, Cornwall, and the Channel Islands. These revealed four extremes in the range of growth-form related to variation in the length of shoot, number and length of internodes and degree of lateral branching. Variation between plants was also shown in the diameter of the mature stem and its ciliation, the length/breadth ratio of the mature leaves and their ciliation, and in the ciliation of the sepals. Experiments were exhibited indicating the plant to be self-sterile; the presence of an out-breeding system might result in heterozygous individuals giving rise to the considerable degree of variation found.—L. C. FROST.

5. A NOMENCLATURE CHANGE FOR A VARIETY OF *HERNIARIA CILIOLATA* MELDERIS

In Herb. Cantab. are Babington's collections at St. Aubin's Bay, Jersey, of *Herniaria glabra* L. and *H. glabra β subciliata*. Pugsley described Playfair's collection of the latter variety from the same locality as *H. ciliata* var. *angustifolia*. As the same range of material was described by both authorities, a new name was suggested for the variety.—L. C. FROST.

6. THE DISCOVERY OF WILLIAM WAVELL'S ANNOTATED FLORA

Recently a copy of Relhan's *Flora Cantabrigiensis* (1785) was discovered containing numerous annotations for the year 1796 by William Wavell who was responsible for many of the first records for the flora of Devon as published by Polwhele in *History of Devonshire*, Vol. I, 1797. The annotations give some additional information to that published by Polwhele. Both the above works were displayed.—L. C. FROST.

7. STUDIES ON *ASPARAGUS OFFICINALIS*

The exhibit illustrated the lecture given at the meeting. Herbarium sheets of male and female plants of the two subspecies were shown, both in flower and in fruit. Photographs of meiosis showing the different chromosome numbers, and tables showing different taxonomic characteristics and rates of germination, were also displayed.

A map showed the distribution of *Asparagus officinalis* subsp. *prostratus* in Anglesey, Cornwall, S. Wales, Dorset, the Channel Islands and S.W. France. Lists from the Channel Island and Lizard localities indicated the uniformity of the plant communities, with constant dominant and sub-dominant species.—E. W. DAVIES.

8. STUDIES IN THE INORGANIC NUTRITION OF SOME BRITISH PLANTS

The restriction of the natural distribution of plants to certain soils may, in part, be related to their mineral nutrition. Results of investigations in this connection with regard to *Juncus squarrosus*, *Nardus stricta*, *Origanum vulgare* and *Sieglingia decumbens* were exhibited. Chemical analyses of the plants and of the soils where they occur were shown for a number of stations scattered throughout Britain. Experimental studies indicated the important influence of exchangeable calcium level in the soil relative to other exchangeable cations in maintaining a nutrient balance in the plants; in particular, the influence of the Ca/K ratio was investigated. The best growth of the plants in culture is, in general, under nutritional conditions similar to those of their natural habitats.—R. L. JEFFERIES and A. J. WILLIS.

9. *MELAMPYRUM PRATENSE* L. FROM CALCAREOUS HABITATS

Melampyrum pratense is usually regarded as a calcifuge species but populations also occur on calcareous soil. The exhibit showed that these populations are recognisable by having ovate to lanceolate leaves instead of linear to linear-lanceolate leaves.—A. J. E. Smith.

FIELD MEETING, SUNDAY, 18th SEPTEMBER.

In the morning Brean Down was visited, when most of the plants for which the area is known botanically were seen. Late-flowering specimens of *Helianthemum apenninum* were found on the rocky slopes, where the abundance of *Carex humilis* and of *Koeleria vallesiana* was striking.

In the afternoon many plants typical of sand dunes and 'slacks' were seen in the Berrow dune system. Of the eyebrights, *Euphrasia occidentalis* was conspicuous in the short turf of the sand-hills. The single colony of *Scirpus holoschoenus*, which has long persisted in one low-lying region, was examined. In the adjoining salt marsh, features which had been discussed on the previous day, such as the clear zonation, were easily recognised. It was obvious that few species were able to survive in the dense *Spartinetum* and *Scirpetum*, but towards the inland margin of the marsh a considerable variety of plants occurred. Some of these plants are characteristically maritime, such as *Carex extensa*, *Juncus gerardii*, *Plantago maritima* and *Triglochin maritima*, whereas others, such as *Alnus glutinosa*, *Iris pseudacorus*, *Oenanthe crocata* and *Triglochin palustris*, are more representative of freshwater habitats. The flourishing colonies of *Juncus subulatus* were observed near the inland edge of the zone of *Scirpus maritimus*.—A. J. Willis.

OBITUARY

Donald Patton (1884-1959).—Donald Patton joined the Botanical Exchange Club in 1920 and remained a member until his death, which took place in Glasgow on 14th July 1959.

He was educated in Glasgow, and graduated M.A. and then B.Sc., and, in 1923, Ph.D. For ten years from 1909 he taught in Bellahouston Academy and in 1919 became Assistant, and later Senior Lecturer, in Botany in the University of Glasgow under Professor F. O. Bower. In 1923 he was appointed Lecturer in Botany at Jordanhill College for the training of teachers, continuing there until his retirement in 1949. He then became curator of the Glasgow University British Herbarium, and his presidential address to the Glasgow and Andersonian Natural History and Microscopical Society in 1953 was devoted to an account of this "herbarium of herbaria", as he called it, because so many herbaria had been donated to it, including his own, the special feature of which is 'Scottish arctic-alpines'. Also after his retirement he undertook demonstrating work in the University and conducted classes for the Department of Extra-Mural Education. Even after ill-health compelled him to give up this teaching work, to his great sorrow, since, in the extra-mural classes there was a very special bond with him, many of the same persons returning each year, he continued to look after the herbarium until physically compelled to give up that work also.

He was elected a Fellow of the Royal Society of Edinburgh in 1926, was a life member of the Botanical Society of Edinburgh and of the British Association, and was closely associated with the various societies in Glasgow concerned with field work. He published many plant records in the journals of the Societies to which he belonged and played an important part in the preparation of the card catalogue of the Flora of the Clyde Area in 1928. More recently, he sent records from the University Herbarium to the B.S.B.I. Distribution Maps Scheme.

Dr. Patton gave information, guidance, and encouragement to all those with whom he came in contact, his students or his fellow naturalists, his hearers of lectures or his co-excursionists, by the competent and happy way in which he linked what one might call the professional and amateur approach to the study of plants. In the West of Scotland he became well known as a teacher and lecturer, as a leader and companion on botanical excursions, and as an author of papers on the flora of Scotland. His name came to be particularly linked with the records of plants of the mountains he loved to climb as long as he was able, not only in the "Clyde" but notably beyond, in Perthshire, and, even more notably there, on Ben Lawers. He visited that botanist's magnet year after year, knew its unique alpine flora in every concealing cranny, visited it with other botanists, experts and novices, but emphasised always the importance of preserving the rarities.

He had the gift of exactitude and enthusiasm in himself and the gift of communicating those botanical virtues to others.

BOTANICAL PUBLICATIONS

An example of river action and its bearing on plant distribution, *Trans. geol. Soc. Glasg.*, **17**, 1922.

Variations in the vegetation along the outcrop of the Lawers-Caenlochan schist, *Rep. Bot. Soc. & E.C.*, **6**, 1923.

The vegetation of Beinn Laoigh, *Rep. Bot. Soc. &E.C.*, **7**, 1924.

The vegetation of the Tinto Hills, *Ann. Anderson. Nat. Soc.*, **4**, 1925.

Nature Study for Beginners. O.U.P., 1928.

Glasgow's Natural History Societies, *Glasg. Nat.*, **17**, 1951.

The British Herbarium of the Botanical Department of Glasgow University, *Glasg. Nat.*, **17**, 1954.

With W. RENNIE

The plants of Possil March, *Glasg. Nat.*, **17**, 1954.

With E. J. A. STEWART

The Flora of the Culbin Sands, *Trans. Bot. Soc. Edinb.*, **26**, 1915.

Additional notes on the Flora of the Culbin Sands, *Trans. Bot. Soc. Edinb.*, **29**, 1924.

The vegetation of the Culbin Sands, *Rep. Bot. Soc. & E.C.*, **7**, 1924.

E. J. A. STEWART AND B. W. RIBBONS.

PERSONALIA AND NOTICES TO MEMBERS

SILENE SECTION *OTITES*

Mrs. Fenella Wrigley, Botany School, Cambridge, is working on *Silene otites* (L.) Wib. *sensu lato* and would be grateful for seed of this plant and related species together with information of where and when collected. Postage will be refunded. The group has a widespread Eurasian distribution centred on the Ukraine.

BUDDLEJA DAVIDII Franch.

Mr. D. H. Kent, 75 Adelaide Road, London, W.13, is interested in the historical spread of *Buddleja davidii* in the British Isles and would be grateful for records. Especially requested are details of habitats and length of time that the species has been known to occur in them.

CREPIS

Mr. J. B. Marshall, Department of Botany, British Museum (Natural History), Cromwell Road, London, S.W.7, is studying the distribution of the British species of *Crepis*. Much confusion and misidentification has occurred in the past, and fresh material, herbarium specimens (on loan for short period) and records would be welcome. Material is particularly requested from the Midlands, northern England, Scotland and Ireland.

CHAROPHYTA

Mrs. S. P. Phillips, Dept. of Botany, British Museum (Natural History), Cromwell Road, London, S.W.7, is working on British Charophytes, and would welcome material for the herbarium, or identification. Fruiting specimens should be collected between May and September, and should be despatched in a plastic bag as soon as possible to: The Keeper, Dept. of Botany, British Museum (Natural History), Cromwell Road, London, S.W.7.

THE BRITISH PTERIDOLOGICAL SOCIETY

The British Pteridological Society originated in 1891, mainly with the intention of fostering the study of variation in ferns and their horticultural possibilities. Since then, however, the scope and membership has widened and the Society organises meetings and excursions designed to bring together botanists especially interested in ferns and fern-allies, both British and foreign, their taxonomy, ecology and culture.

More information may be obtained from the Acting Secretary and Treasurer, J. W. Dyce, "Hilltop", 46 Sedley Rise, Loughton, Essex.

FLORA OF NORFOLK

Dr. C. P. Petch and Mr. E. L. Swann (282 Wootton Road, King's Lynn, Norfolk) are collecting data relating to the flora of Norfolk. The latter would be glad to receive any information on the subject, particularly with reference to collections (other than those in the National Herbaria) and personal records and notes.

REVISION OF LIST OF RECORDERS

We must apologise to those members who have acted as Referees for the Maps Scheme and whose names do not appear in the List printed in *Proceedings*, **4**, 112-115 (1961). This is now being revised and any members who wish to offer their services should write to the Secretary, Development and Rules Committee, c/o Department of Botany, British Museum (Natural History), Cromwell Road, London, S.W.7.

BACK-NUMBERS OF "WATSONIA" AND "PROCEEDINGS"

Part of the Society's revenue is obtained from the sale of sets of *Watsonia* and *Proceedings* to booksellers and libraries.

Unfortunately, certain parts of both periodicals are now in short supply and it will soon become difficult to prepare complete "runs" The numbers concerned are *Watsonia*, Vol. 2, Parts 5 and 6, and Vol. 3, Part 5, and *Proceedings*, Vol. 2, Part 4. Members who have any of these parts that they no longer require are invited to assist the Society by sending them to Mr. E. B. Bangerter, c/o Dept. of Botany, British Museum (Natural History), Cromwell Road, London, S.W.7.

B.S.B.I. BOOK SERVICE

Many county Floras and other botanical books are out of print and difficult to obtain and the officers of the Society receive many enquiries from members as to where they may be obtained.

A card index of members' desiderata has now been prepared with the object of assisting them to obtain books they need to carry out their studies.

The index has been prepared by the Hon. Assistant Secretary, Mr. D. H. Kent, 75 Adelaide Road, London, W.13, and members desiring to make use of this facility are invited to write to him giving details of the books which they are anxious to acquire. A stamped addressed postcard, for reply, should be sent for each book required. It must be pointed out that some botanical works are very scarce indeed and it may be some time before they can be tracked down; every effort will, however, be made to trace copies of books required.

Members who have botanical books for disposal are also invited to write to Mr. Kent giving details of the volumes concerned and their prices.

BRITISH POISONOUS PLANTS

The Pharmaceutical Society of Great Britain are preparing a collection of 35 mm. transparencies of poisonous plants found growing wild in Britain. Members who have coloured photographs or transparencies of poisonous plants and are willing to allow them to be copied are requested to send details to: The Director, The Pharmaceutical Society of Great Britain, 17 Bloomsbury Square, London, W.C.1.

THREATS TO BRITISH FLORA

Members are urged to report to Dr. C. D. Pigott, Botany Dept., The University, Sheffield 10, any threats to the British flora. The Council has appointed a Conservation Committee to deal with such matters and every effort will be made "to promote in every way possible the conservation of the British flora".

TOXIC SPRAYS

The Society is collecting information about the effect on native vegetation of toxic chemicals used for spraying crops. The increasing use of weed-killing chemicals on arable land implies a threat to neighbouring uncultivated land or woods since the spray can be carried a considerable distance under suitable conditions. Members who observe damage from this cause are asked to send full details to Dr. C. D. Pigott, Botany Dept., The University, Sheffield 10.

BRITISH HERBARIA

An errata sheet to *British Herbaria* has now been printed. Members wishing to receive a copy should send a stamped self-addressed envelope to Mr. D. H. Kent, 75 Adelaide Road, London, W.13.

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A limited number of relevant advertisements will be accepted for the Society's publications as space permits. Enquiries should be addressed to Mr. D. H. Kent, 75 Adelaide Road, London, W.13.

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Many botanists have assisted in the preparation of this work, which incorporates the *London Catalogue of British Plants* and was undertaken by Mr. Dandy on behalf of a sub-committee of the Society appointed for this purpose. It was published in the summer of 1958.

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OF THE
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Editor: D. H. KENT

Vol. 4 DECEMBER, 1961 Pt. 3

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A CENSUS LIST OF WOOL ALIENS FOUND IN BRITAIN, 1946-1960

Compiled by J. E. LOUSLEY

Plants introduced into Britain by the woollen industry have attracted increasing interest from field botanists in recent years and this follows a long period of neglect. Early in the present century Ida M. Hayward, assisted by G. C. Druce, made a detailed study of the alien plants introduced with wool in southern Scotland, culminating in 1919 with the publication of *The Adventive Flora of Tweedside.* The wide field of new interest opened up by Miss Hayward's discoveries encouraged a group of Yorkshire botanists to investigate the plants introduced by the heavy woollen industry round Bradford.

It is unfortunate that serious work in both Scotland and Yorkshire came to an end at about the same time. At Galashiels the mills were no longer allowed to pollute the rivers by the discharge of untreated effluents, and in the preface to *The Adventive Flora of Tweedside* reasons were given why few aliens were to be expected in future. Although she continued to reside in the town, and to take a keen interest in botany, Miss Hayward's own discoveries after 1919 were negligible. I found a few interesting species on the Gala shingle in 1939, and other botanists found a few, but aliens no longer abounded by the rivers and we had insufficient knowledge to know where else to look. In Yorkshire, J. Cryer, F. Arnold Lees, F. Rhodes and E. C. Horrell were enthusiastic students of wool aliens. Their hunting ground was mainly Frizenhall sewage farm where the Bradford drains were discharged and, although they had sometimes found plants elsewhere, the closure of the sewage works seems to have put an end to their studies. After 1920 there were only occasional records of wool aliens from Yorkshire or elsewhere. Many of these were recorded without any indication that the finders were aware of their connection with the industry.

We owe our present interest to the enthusiasm and enterprise of J. G. Dony. In 1946, when he was collecting records for his *Flora of Bedfordshire,* he led a B.S.B.I. field meeting which visited some gravel pits at Eaton Socon where a number of wool aliens were seen. On the following day the party visited a railway siding in the same county, and further wool aliens were found (Dony ,1948). On enquiry he found that wool waste ("shoddy") was unloaded at the sidings and delivered to local farmers for use as a manure, and when this was followed up foreign weeds were found to be plentiful in their fields. By 1952 he had found 112 species of wool aliens in Bedfordshire (Dony, 1953) and was in touch with the firms near Bradford that despatched the "shoddy" —in that year he went to Yorkshire and in Bradford, Morley, Heckmondwike and Kirkheaton found over 40 species.

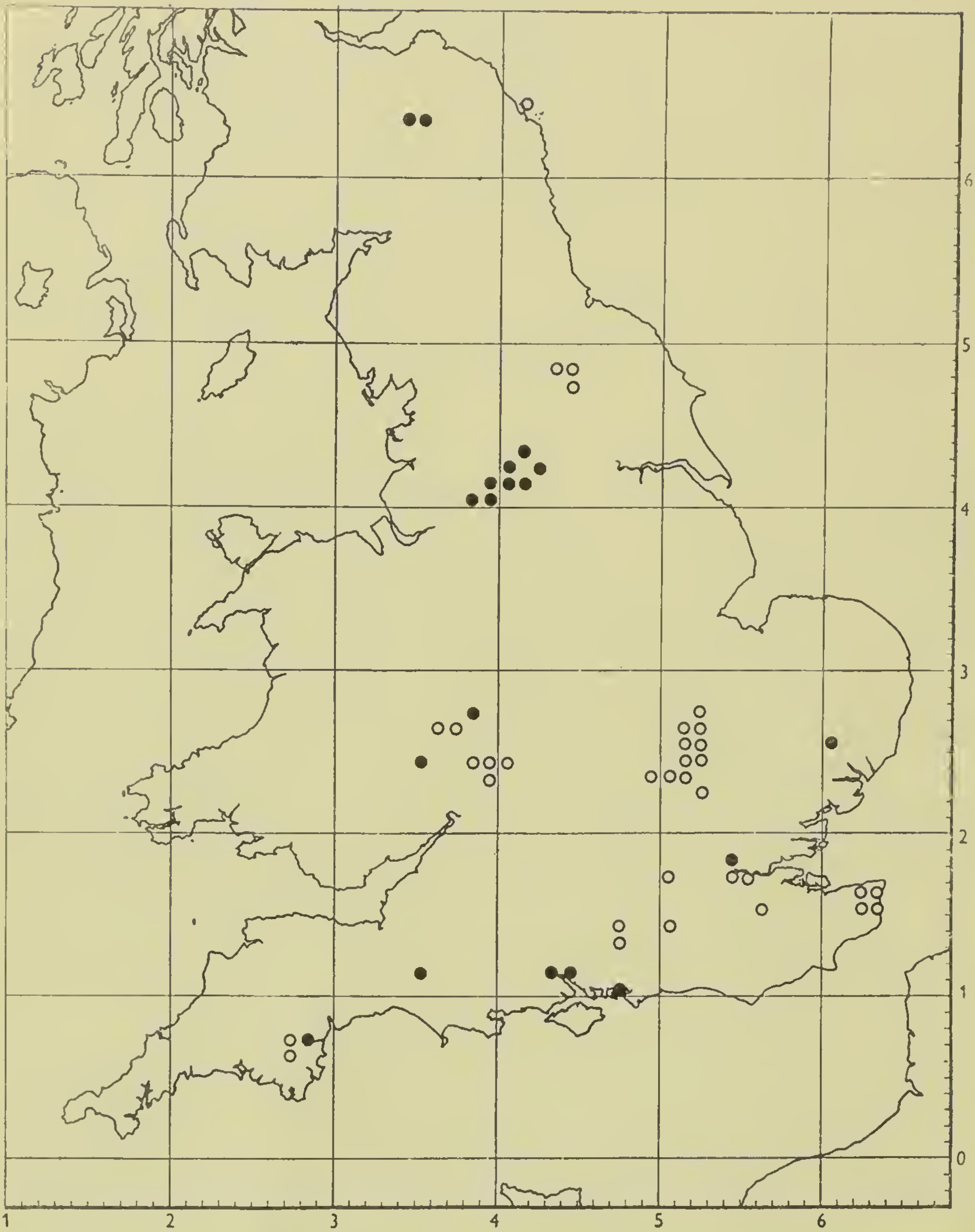

Fig. 1.—GRID SQUARES IN WHICH WOOL ALIENS HAVE OCCURRED, 1946-1960.

●—Found in the vicinity of mills, works or factories.
○—Other occurrences.

Dr. Dony's work not only encouraged a considerable number of botanists to take an interest in wool aliens but it placed the study on a much wider basis than before. It was now appreciated that these plants could be found in quantity in places far from woollen manufacturing districts, and that wherever shoddy was used as a manure well grown plants could be expected on railway sidings as well as in the fields. The new facts provided an explanation of many plants now known to be wool aliens from widely scattered parts of the country, and fields such as the one found by P. M. Hall at Portchester, Hampshire, in 1939 (Hall, 1940), fitted into a general scheme. As a result of Dony's enthusiastic studies in Bedfordshire other botanists were encouraged to record these plants elsewhere. Wool aliens are now known to occur in at least 27 vice-counties.

By early 1960 there were three county lists ready for publication; one for Bedfordshire by Dony, one for Worcestershire by Miss C. M. Goodman, and another for North Hampshire by the writer. To have printed three separate lists would have made unreasonable demands on space and would not have fulfilled the need for a working list of the wool aliens found in Britain in recent years. The other two writers very generously offered to place their accounts at my disposal and these are incorporated in the compilation which follows.

The records have been collected from the following sources:—

V.c. 3, S. DEVON. Specimens collected from 1946 onwards from the vicinity of a mill at Newton Abbot by John E. Raven, Dr. C. West, D. McClintock, J. E. Lousley, and Miss M. McCallum Webster. In addition Miss Webster found a few species in a root crop near Buckfast (Webster, 1960).

V.c. 5, S. SOMERSET. A list prepared by Mrs. V. I. Ricketts of species she found on refuse tips at Yeovil and named by C. C. Townsend, with some additions provided by Miss M. McCallum Webster. This list includes a number of natives of Ethiopia and adjacent countries of East Africa.

V.c. 11, S. HANTS. All the records included are from Southampton Docks where wool waste was deposited in a reclamation area, and were made by J. E. Lousley. From the field at Portchester found by Hall in 1939 (Hall, 1940), and isolated records of species likely to be wool aliens from fields and tips over a considerable area, it seems probable that waste from carpet factories is distributed round Southampton.

V.c. 12, N. HANTS. Plants found at Froyle in 1947 and 1948 by C. Langridge, and in the parishes of Alton, Selborne and Blackmoor in 1959 and 1960 by Lady Anne Brewis, J. E. Lousley, Miss M. McCallum Webster, and others. Gilbert White in his *Naturalist's Journal* covering the years 1768 to 1793 records the use of woollen rags as a manure in a hop garden in this district (Johnson, 1931, p. 340), so the use of wool on these light soils has a long history.

V.c. 13, W. Sussex. A few wool aliens were found by A. W. Westrup by a glove factory at Emsworth. This deserves further investigation.

V.c. 15, E. Kent. Wool aliens were reported by R. A. Graham from Sandwich in 1958 and were subsequently found in that district and round Birchington by D. McClintock, who is keeping the records for the county. From isolated records from Faversham and elsewhere it seems that the use of shoddy in connection with the fruit-growing industry may be widespread.

V.c. 16, W. Kent. Wool aliens were first detected near Hextable by F. Rose and E. C. Wallace in 1948 (Lousley, 1949 and 1950). In 1960 D. McClintock found them in greater quantity in several places in the vicinity of Borough Green. There have also been scattered records of species likely to be wool aliens from hopfields near Malling, and from the Thames marshes near Abbey Wood. The records for this vice-county are based on a list supplied by D. McClintock.

V.c. 17, Surrey. A few wool aliens were found near Chilworth by J. C. Gardiner in 1959 and additions made in 1960. Isolated records of *Xanthium spinosum* and other species in this district in the past suggest that shoddy may be in regular use.

V.c. 18, S. Essex. All the records included in the list are from a few square yards of a refuse tip near Barking in 1958 (Lousley, 1959) but there are numerous isolated records of species likely to be wool aliens from tips in this district.

V.c. 20, Herts. Records supplied by J. G. Dony from Wymondley and Stevenage. It will be recalled that J. E. Little distributed wool aliens found in the same district in 1928 (Little, 1929b, and 1932).

V.c. 21, Middlesex. *Juncus pallidus* and other rushes have persisted in a gravel pit at East Bedfont. They are believed to have been introduced with "shoddy" used on nearby arable land (Lousley, 1947; Kent & Lousley, 1956).

V.c. 24, Bucks. J. G. Dony has found a few species in this county.

V.c. 25, E. Suffolk. All records included are from a tannery near Stowmarket (Barnes, 1959).

V.c. 29, Cambridge. A few records supplied by J. G. Dony are included.

V.c. 30, Bedford. Based on a list supplied by J. G. Dony incorporating observations since 1946 to which many botanists have contributed (Dony, 1948, 1953, 1953b, 1955). To indicate rarity, dates are given in cases where a species has been found only once or twice.

V.c. 31, Hunts. Based on a list supplied by J. G. Dony of species found on railway sidings between St. Neots and Huntingdon.

V.c. 33, E. Gloucester. Records supplied by C. W. Bannister from arable fields at Ashchurch and Kinsham.

V.c. 36, HEREFORD. A few records are included of plants found by Mrs. L. E. Whitehead at Hereford station, but reports of species which are usually wool aliens from the sewage farm and elsewhere suggest that others are likely to be found in the district.

V.c. 37, WORCESTER. The records included are those in a list supplied by Miss C. M. Goodman who has been compiling them since 1952. Many botanists have contributed but special mention must be made of C. W. Bannister, who has given most valuable assistance, and Miss M. McCallum Webster. To indicate rarity, dates are included where a species has been found only once or twice. Most of the records are from arable fields round Evesham and Pershore but wool aliens are widely scattered in the county and occur, for example, also at Newnham Bridge and Kidderminster.

V.c. 59, S. LANCASTER. All records are from the east side of the county round Rochdale and Mossley, where wool as well as cotton is used in the manufacture of textiles. They are all from localities discovered by the Rev. C. E. Shaw and most of them are based on specimens collected, or notes made, by the writer in his company.

V.c. 62, NORTH-EAST YORK. All records are from arable fields round Thirsk and Topcliffe found by Miss C. M. Rob, and based on specimens collected by her, the writer, J. G. Dony or Miss M. McCallum Webster.

V.c. 63, SOUTH-WEST YORK. Wool aliens have been found on waste ground, railway sidings and sewage works over a wide area including Bradford, Halifax, Kirkheaton, Morley, Batley and Shipley. Those who have contributed include J. G. Dony, D. McClintock, Mrs. F. Houseman, Miss M. McCallum Webster, L. Magee, M. M. Sayer, Mrs. R. Draper and J. E. Lousley.

V.c. 64, MID-WEST YORK. The records are mainly those from waste ground and near a mill at Baildon, and are based on a list prepared by Mrs. F. Houseman, who discovered these localities.

V.c. 65, NORTH-WEST YORK. All records are from a few fields in the Kirklington district discovered by Miss C. M. Rob in 1958 and also visited by Miss M. McCallum Webster.

[V.c. 68, CHEVIOTLAND. *Acaena anserinifolia* and *Solanum triflorum* established on Holy Island were probably introduced with wool (Lousley, 1956).]

V.c. 79, SELKIRK, and v.c. 80, ROXBURGH. The vicinity of Galashiels, which was investigated so profitably by Hayward and Druce early in the century, still produces wool aliens on shingle, refuse tips, and at the sewage farm. The records included have been contributed by J. E. Lousley, Miss E. P. Beattie, and Miss M. McCallum Webster.

Care has been taken to restrict the list to records where there was no reasonable doubt about the introduction of the plants with wool and this has necessitated the exclusion of records without supporting evidence. In most cases no difficulty has arisen but where there has been doubt, and especially with species which occur commonly as natives, the decision has been based on the following considerations:—

(a) The frequent occurrence of the species in association with undoubted wool aliens.

(b) Observation of plants growing on heaps of shoddy or the presence of seeds in shoddy—usually evidenced by growing plants from this in sterile soil under cultural conditions.

(c) The occurrence of the species in Australia or South Africa (from where most of our wool is imported). This has been given additional weight in the case of plants known to be common on sheep-runs.

(d) The inclusion of the species as an accepted wool alien in lists compiled in other European countries.

(e) Observation of differences between the form found and native forms of the species. In some cases these differences are slight and not easy to describe: in others it is likely that further search will reveal that the native and foreign plants have been separated as forms, varieties, or even species.

In the case of some common British species their frequent introduction with wool is greatly under-recorded since most observers have failed to note them and the evidence was not available until recently. Examples of this include *Spergularia rubra, Dactylis glomerata, Holcus lanatus* and *Phleum pratense.* There are, no doubt, other species of this kind still to be added.

The identification of wool aliens imposes many difficult problems, and while every care has been taken, it must be emphasized that this list is intended as a basis for further research. Herbarium material is therefore cited to assist workers interested in any particular group, though these citations are by no means complete. In both Australia and Africa, taxonomic research is advancing extremely rapidly at the present time and frequent revision of our material will be required as new accounts are published. Similarly, the nomenclature will require revision.

For the identification of Bedfordshire specimens J. G. Dony has been mainly responsible, and many of those from Worcestershire, Yorkshire, Kent and Hampshire have been named by J. E. Lousley. We are grateful to Dr. C. E. Hubbard and Miss M. McCallum Webster for their great assistance in naming the grasses, to Mr. J. P. M. Brenan and Dr. P. Aellen for naming many of the *Amaranthaceae* and *Chenopodiaceae,* and to many members of the staffs of the Royal Botanic Gardens, Kew, and the British Museum (Natural History) for help with other groups. The staff of the Royal Botanic Garden, Edinburgh, have assisted with the identification of Tweedside aliens.

In addition to the botanists already mentioned, thanks are due to a very large number of helpers who have contributed records or specimens but are too numerous to mention individually. But for the generosity of J. G. Dony and Miss C. M. Goodman in placing their lists at my disposal this account would not have been possible. Special thanks must also be recorded to Miss M. McCallum Webster for her great help. I am also indebted to D. H. Kent for secretarial assistance and advice, and to Dr. F. H. Perring for preparing the map from my data.

The following abbreviations have been used to indicate the location of herbarium material:—

B	The private collection of Miss E. P. Beattie, Edinburgh.
GD	The private collection of Miss C. M. Goodman, Birmingham.
EXR	The herbarium of the Department of Botany of the University of Exeter.
K	The herbarium of the Royal Botanic Gardens, Kew.
BM	The herbarium of the Department of Botany, British Museum (Natural History).
L	The private collection of J. E. Lousley, Streatham, London.
LTN	The herbarium of the Public Museum and Art Gallery, Luton.
R	The private collection of Miss C. M. Rob, Thirsk.
W	The private collection of Miss M. McCallum Webster, Kew.

Exsiccatae from the *Wool Adventive Flora of Britain* distributed by J. E. Lousley, of which 1,659 numbers had been issued by the end of 1960, have been sent to the British Museum (Natural History), Royal Botanic Gardens, Kew, Royal Botanic Garden, Edinburgh, the National Museum of Wales, and several herbaria overseas.

It has been decided not to include countries of origin in the list, since merely to add the countries in which the species are believed native would be extremely misleading, while to give all the countries in which they are known to occur would have doubled the length of the paper. A considerable proportion of the plants listed, and especially those native in Mediterranean countries, have been found in abundance in sheep raising districts far from their native homes. As a broad generalization, approximately 70% have come to us from Australasia, 20% from Africa, and say 10% from the rest of the world, but nearly all the common wool aliens have been transferred between continents first.

The list includes 529 species, of which 187 are grasses. In addition, a very large number of varieties have been named, and if these had been treated separately the list would have been much longer. In their *Adventive Flora of Tweedside,* Hayward and Druce claimed 359 species, of which 82 were grasses, but some of their names are not accepted to-day.

The families are in the sequence of the *List of British Vascular Plants,* 1958, edited by J. E. Dandy, and genera and species arranged alphabetically.

PAPAVERACEAE

ARGEMONE MEXICANA L. (usually as var. *ochroleuca* (Sweet) Lindl.).)—12 (L); 30 (LTN); 37 (L); 59 (L); 62 (W); 63 (L); 64.

GLAUCIUM CORNICULATUM Curt.—30, 1959 (LTN).

[PAPAVER HYBRIDUM L. has been grown from shoddy by Webster.]

CRUCIFERAE

BRASSICA GRIQUANA N. E. Br.—30, 1951 (LTN, L).

B. JUNCEA (L.) Czern. & Coss.—12 (K); 30 (LTN); 37 (L).

B. TOURNEFORTII Gouan.—3 (EXR); 12 (L); 15 (L); 30 (LTN); 37 (GD, L); 59; 62 (L); 63; 64; 65.

CAPSELLA GRACILIS Grenier (*C. bursa-pastoris* × *rubella*)—3 (K, EXR, L).

DIPLOTAXIS ERUCOIDES (L.) DC.—37, 1958 (L).

HIRSCHFELDIA INCANA (L.) Lagr.-Foss.—3 (EXR); 15; 16; 30 (LTN); 37 (GD); 63 (L); 64 ; 80 (W).

LEPIDIUM ALETES Macbr.—37, 1958 (L); 63 (L); 65 (L).

L. BONARIENSE L.—80 (K, W).

L. DENSIFLORUM Schrad.—30 (LTN).

L. DESERTORUM Eckl. & Zeyh.—80 (K).

L. DIVARICATUM Soland.—30 (L); 37, 1959 (L); 63 (L); 65 (L).

subsp. ECKLONI (Schrad.) Thell.—63 (*Herb. F. Houseman*).

L. FASCICULATUM Thell.—63 (W).

L. HYSSOPIFOLIUM Desv.—3 (EXR); 12 (K, L); 15; 16; 30 (LTN); 37 (GD), 59; 62; 63; 64; 80 (W). The differences between this species and *L. divaricatum* are critical and the records require revision.

L. PSEUDO-DIDYMUM Thell.—80 (K. W).

RAPISTRUM RUGOSUM (L.) All.—5; 17; 30, 1955 (LTN); 37, 1954 (GD); 59; 62.

R. ORIENTALE (L.) Crantz—12 (K); 37, 1955.

SISYMBRIUM ALTISSIMUM L.—63 (L); 64; 80 (W).

S. ERYSIMOIDES Desf.—3 (EXR); 12 (L); 16 (L); 20; 30 (LTN); 37 (GD), 59; 65 (L).

S. IRIO L.—3 (L); 12 (L); 15; 30 (LTN); 31; 37 (GD, L); 59 (L); 63; 64; 65; 80 (K, W).

S. THELLUNGII O. E. Schultz—37, 1956.

VELLA ANNUA L. (*Carrichtera annua* (L.) Aschers. & Schw.)—12 (L); 30, 1951 (LTN, L); 64 (W).

FRANKENIACEAE

Frankenia pulverulenta L.—63, 1958 (l).

CARYOPHYLLACEAE

Kohlrauschia prolifera (L.) Kunth—63 (l).
Polycarpon tetraphyllum (L.) L.—63; 80 (w).
Silene gallica L. (including S. anglica L.)—3 (k); 5; 37, 1955 (l); 62 (k); 63; 64.
  S. nocturna var. brachypetala Benth.—12 (l); 30, 1959 (ltn).
Spergula arvensis L.—12 (l). Probably not uncommon but overlooked.
Spergularia diandra (Guss.) Heldr. & Sart.—37, 1959 (l).
  S. rubra (L.) J. & C. Presl. (A form differing from native plants in the colour and shape of the stipules)—12 (k, l); 64; 80 (w).

ILLECEBRACEAE

Herniaria hirsuta L. (including subsp. cinerea (DC.) Loret & Barr.)—12 (w); 15 (l); 30, 1957 (k, ltn); 37, 1957 (l); 63 (l).
Paronychia brasiliana DC.—12 (w); 63 (kl).

PORTULACACEAE

Portulaca oleracea L.—12 (l); 37 (l); 63 (l); 64.

AIZOACEAE

Carpobrotus sp.—63 (l).
Cryophyton crystallinum (L.) N.E.Br.—30, 1956 (ltn); 37, 1959; 63 (l).
Drosanthemum floribundum (Haw.) Schwantes—12 (l).

AMARANTHACEAE

Achyranthes aspera var. argentea (Lam.) C. B. Clarke—5.
Alternanthera nodiflora R. Br.—12 (l).
Amaranthus albus L.—12 (l); 37, 1957 (gd); 59; 79 (b); 80 (k).
  A. blitoides S. Wats.—5; 11 (l); 37, 1959 (l); 63 (l). (See Sandwith, 1948).
  A. capensis Thell.—37, 1958 (l).
  A. clementii Domin.—37, 1959 (gd).
  A. crispus (Lesp. & Thév.) Terrace.—37, 1958 (l).
  A. deflexus L.—3 (k, l); 37, 1955 (gd, l); 63 (l).
  A. dinteri var. uncinatus Thell.—12 (k, l); 30 (ltn); 37 (gd, k); 62 (k); 63 (l); 64.
  A. graecizans L. (*A. angustifolius* Lam.).—5; 37, 1958 (l).
  subsp. silvestris (Vill.) Brenan.—37, 1960 (k).

A. HYBRIDUS L. (*A. chlorostachys* Willd.).—3 (EXR); 5; 11; 12 (L); 15; 16; 20; 25; 30 (LTN); 37 (GD); 59; 62; 63; 64; 65; 79 (B).
subsp. INCURVATUS (Timeroy ex Gren. & Godr.) Brenan (subsp. *cruentus* (L.) Thell.)—12 (K); 37 (L).
A. MACROCARPUS Benth.—12 (L); 37, 1955 (GD, L), 1959 (L).
A. MITCHELLII Benth.—12 (L).
A. PALMERI S. Wats.—12 (K).
A. QUITENSIS Humb. Bonpl. & Kunth—15 (L); 16; 37 (GD, L).
A. RETROFLEXUS L. (including var DELILEI (Richter & Loret) Thell.)—3 (EXR); 5; 11; 12 (K); 15; 16; 25; 30 (LTN); 31; 37 (L); 62; 63 (K); 64.
A. SPINOSUS L.—5; 30, 1953 (L); 63 (L).
A. THUNBERGII Moq. (often with spotted leaves—f. MACULATUS Thell.)—11 (L); 12 (L); 15; 16; 25; 30 (LTN); 37 (GD); 59; 62; 63 (L); 64; 79 (B); 80 (L).
A. VIRIDIS L.—25; 30 (L); 37 (K, L).
A. STANDLEYANUS Parodi ex Covas (*A. vulgatissimus* auct., non Speg.)—37, 1955 (GD).

CHENOPODIACEAE

ATRIPLEX—Much of the material of this genus is immature and in need of revision.
A. EARDLEYAE Aellen.—30, 1949 (LTN).
A. MUELLERI Benth. agg.—30, 1950 (LTN); 37 (L); 63 (L).
A. NITENS Schrank. (not typical)—37 (L).
A. SEMIBACCATA R.Br.—30, 1948 (LTN).
A. SUBERECTA Verdoorn—30, 1955 (LTN).
BASSIA BIRCHII (F. v. Muell.) F. v. Muell.—12 (K, L).
B. ECHINOPSIDA F. v. Muell.—12 (K).
B. QUINQUECUSPIS F. v. Muell.—12 (L); 63 (K).
CHENOPODIUM ALBUM L. Many forms and varieties of this species occur and are to be found in all places where wool aliens are plentiful.
C. AMBROSIOIDES L. (including C. ANTHELMINTICUM auct.)—5; 16; 37, 1959 (L); 63 (L); 65 (L).
C. ARISTATUM L.—37 (K).
C. AURICOMIFORME Murr & Thell.—30 (LTN, L); 37 (*Herb. J. P. M. Brenan*).
C. BLACKIANUM Aellen (*Dysphania littoralis* R.Br.)—12 (L).
C. × BONTEI Aellen—12 (L); 37, 1958 (L).
C. BOTRYS L.—12 (L).
C. CARINATUM R.Br. (including var. MELANOCARPUM (J. M. Black) Aellen)—12 (K, L); 30 (LTN); 37 (K, L); 62; 63 (L); 64.
C. CRISTATUM (F. v. Muell.) F. v. Muell.—12 (K, L); 15 (L); 16 (L); 30 (K, LTN); 37 (GD); 63 (L); 64.
C. GIGANTEUM D. Don—30 (LTN); 37 (GD); 63 (L); 64.
C. GLAUCUM L.—11 (L); 15; 16; 63 (L).

C. HIRCINUM Schrad. (including var. DEMINUTUM Ludw.)—18 (L); 37 (K, GD, L); 63 (L).

C. HYBRIDUM L.—30 (LTN).

C. MYRIOCEPHALUM (Benth.) Aellen (*Dysphania myriocephala* Benth.)—12 (K).

C. MULTIFIDUM L. (*Roubieva multifida* (L.) Moq.)—12 (K); 63 (L).

C. MURALE L.—3 (EXR); 5; 16; 30 (LTN); 37 (L); 59; 62; 64; 80 (W).

C. NITRARIACEUM F. v. Muell.—12 (K); 37 (K); 63 (L); 64.

C. PHILLIPSIANUM Aellen?—63 (L).

C. PRATERICOLA var. LEPTOPHYLLOIDES Aellen—37, 1955 (L).

C. POLYGONOIDES (Murr) Aellen?—63 (K).

C. PROBSTII Aellen—5; 11; 12 (L); 15; 16 (L); 20; 30 (LTN); 31; 37 (GD); 59; 62; 63 (L); 64; 65; 80 (W).

C. PROCERUM Hochst. ex Moq.—5 (K).

C. PSEUDAURICOMUM Murr—63 (L).

C. PUMILIO R.Br.—12 (K, L); 16 (L); 30 (K, LTN); 37 (GD); 59; 63 (L); 64. (See Brenan, 1948.)

C. SCHRADERANUM Schult.—12 (K, L); 30, 1952 (LTN); 37, 1960 (L).

C. STRICTUM Roth—30, 1958 (LTN); 37, 1955 (GD).

C. URBICUM L.—30, 1958 (LTN); 37, 1955 (GD).

KOCHIA SCOPARIA var. VILLOSA Moq.—12 (K).

K. DENSIFLORA Turcz.—37, 1953 (L); 63 (L). (See Aellen, 1955). Perhaps synonymous with *K. scoparia* var. *villosa*.

MONOLEPIS NUTTALLIANA (Schult.) Greene—30, 1950 (LTN).

RHAGODIA HASTATA R.Br.—15 (L); 16.

SALSOLA PESTIFERA A. Nels.—11; 30 (LTN); 31; 37 (GD); 63 (L); 64.

SCLEROBLITUM ATRICIPLINUM (F. v. Muell.) Ulbr.—30, 1952 (K).

PHYTOLACCACEAE

[PHYTOLACCA ACINOSA Roxb.?—63 (L). Not certainly a wool alien.]

TILIACEAE

TRIUMFETTA ANNUA L.—30 (*Herb. N. Y. Sandwith*).

MALVACEAE

ANODA CRISTATA var. BRACHYANTHA (Reichb.) Hochr.—37, 1958 (L).

ABUTILON THEOPHRASTI Medic.—30 (LTN); 37 (GD); 63 (W).

HIBISCUS TRIONUM L.—3 (W); 5; 30 (LTN); 37, 1958, 1960 (L).

LAVATERA CRETICA L.—37, 1958 (L).

L. PLEBEIA Sims—30, 1950 (LTN), EFLE (L); 37, 1959 (L).

MALVA NICAEENSIS All.—5; 30 (LTN); 63.

M. PARVIFLORA L.—3 (EXR); 12 (K, L); 15; 30 (LTN); 37 (GD); 62; 63 (L).
M. PUSILLA Sm.—3 (W); 15; 16; 18 (L); 30 (LTN); 37 (GD); 62 (K); 63 (L); 65.
M. VERTICILLATA L.—5; 37 (L, K).
MALVASTRUM COROMANDELIANUM (L.) Garcke—30, 1959 (K, LTN).
M. PERUVIANUM (L.) A. Gray—30, 1949 (LTN).
M. SPICATUM A. Gray—12; 30, 1959 (LTN).
SIDA CORDIFOLIA L.—30, 1959 (LTN).
S. GLOMERATA Cav.—30, 1952 (LTN).

GERANIACEAE

ERODIUM BOTRYS (Cav.) Bertol.—3 (EXR); 12 (L); 15; 16 (L); 20; 25; 30 (LTN); 31; 37 (GD); 59; 62; 63 (L); 64; 65; 79 (B); 80.
E. CHIUM Willd.—12; 30, 1958 (L).
E. CICONIUM (L.) Willd.—30 (LTN, L).
E. CICUTARIUM (L.) L'Hérit. (many forms of this differ from those of the native British species)—3 (K); 11; 12 (L); 15; 16 (L); 25; 30 (LTN); 37 (GD); 59; 62; 63; 64; 79 (B); 80 (W).
E. CRINITUM Carolin (see Melville, 1959)—12 (K, L); 15; 16 (K, L); 29; 30 (LTN); 31; 37 (K, GD, L); 62, 63 (L); 64.
E. CYGNORUM Nees subsp. CYGNORUM—3 (W); 12 (K, L); 30 (LTN); 37 (K, GD, L); 59; 62; 63; 65.—subsp. GLANDULOSUM Carolin.—37, 1958 (L).
E. MALACHOIDES (L.) Willd.—3 (K, EXR); 30 (LTN); 37, 1955 (GD), 1956 (L); 63.
E. MOSCHATUM (L.) L'Hérit.—3 (EXR); 12 (L); 15; 16 (L); 20; 25; 30 (LTN); 31; 37 (GD); 59; 62; 63; 64; 79 (B); 80 (W).
E. OBTUSIPLICATUM (Maire, Weiller & Wilczek) J. T. Howell 3 (EXR); 16; 30 (LTN); 37 (GD); 59 (L); 62; 63; 65.
E. STEPHANIANUM Willd.—37, 1958 (L).
GERANIUM PUSILLUM L.—12; 79 (B).
MONSONIA BIFLORA DC.—30, 1951 (L).
M. BREVIROSTRATA Knuth—30 (LTN, L), 31; 37, 1958 (K, L); 62; 63 (W); 65 (R).
PELARGONIUM INODORUM Willd.—12 (L).

LEGUMINOSAE

ASTRAGALUS STELLA DC.—37, 1958 (L).
HEDYSARUM PALLENS (Moris) Halacs.—37, 1955 (L).
H. SPINOSISSIMUM L.—30, 1959 (LTN, L); 37, 1958 (L).
LATHYRUS SETIFOLIUS L.—63 (L).
LUPINUS ANGUSTIFOLIUS L.—12 (K); 59.
MEDICAGO—Most species are very variable and many named varieties have been reported.

M. ARABICA (L.) Huds.—3 (EXR); 5; 12 (L); 15; 16; 20; 25; 30 (LTN); 37 (GD); 59; 62; 63; 64; 79 (B); 80.
M. ASCHERSONIANA Urb.—12 (L); 16; 30 (LTN); 37 (GD); 59 (L); 63 (L).
M. CILIARIS (L.) Krock.—30, 1950 (L), 1955 (LTN), 1958 (K, L).
M. LACINIATA Mill.—3 (EXR); 12 (L); 15; 16 (L); 20; 30 (LTN); 31; 37 (GD); 59; 62; 63; 64; 65; 79 (B); 80 (W).
M. MINIMA (L.) Bartal.—3 (EXR); 12 (L); 15; 16 (L); 17; 18 (L); 20; 24; 25; 29; 30 (LTN); 31; 33 (L); 37 (GD); 59; 62; 63 (L); 65; 79 (B); 80 (W).
M. POLYMORPHA L. (*M. hispida* Gaertn.; *M. denticulata* Willd.)—3 (EXR); 5; 12 (L); 15; 16 (L); 17; 20; 25; 30 (LTN); 33 (L); 37 (GD); 59; 62 (L); 63 (L); 64; 65; 79 (B); 80 (W).
M. PRAECOX DC.—3 (K, L); 12 (L); 15; 16 (L); 17; 30 (LTN); 31; 33 (L); 37 (GD); 62; 63 (L); 79 (B); 80 (W).
M. TRIBULOIDES Desr.—12 (K); 30 (LTN); 37 (GD, L); 62 (L); 63 (L).

MELILOTUS ALBA Medic.—3 (EXR); 63 (L).
M. INDICA (L.) All.—3 (EXR); 12 (L); 15; 16; 17; 30 (LTN); 37 (GD); 59; 63; 65.
M. SULCATA Desf.—30, 1951 (LTN).

PSORALEA sp.—12 (L).

SESBANIA ACULEATA (Schreb.) Poir.—30, 1959 (LTN).
S. BENTHAMIANA Domin—63 (K, L).

SCORPIURUS SUBVILLOSUS L.—30 (LTN); 37 (L).
S. SULCATUS L.—30 (LTN); 37, 1958 (L).

TRIFOLIUM AGRARIUM L.—30 (L).
T. ANGUSTIFOLIUM L.—3 (L); 12 (L); 15; 16; 20; 30 (LTN); 37 (GD); 59; 62; 63 (L); 64; 65 (L).
T. ARVENSE L.—15; 65—much more common than these records indicate.
T. CAMPESTRE Schreb.—is commonly associated with wool aliens, and probably introduced with them.
T. CERNUUM Brot.—16 (L); 37 (L); 65 (K, L).
T. ECHINATUM M. Bieb.—30, 1958 (LTN).
T. FRAGIFERUM L.—15.
T. GLOMERATUM L.—3 (W); 12 (K, L); 16 (L); 30 (LTN); 33 (L); 37 (GD, L); 63 (L); 65.
T. LAPPACEUM L.—37, 1958 (L).
T. PATENS Schreb.—30, 1958 (LTN, L).
T. PURPUREUM Lois.—30, 1958 (LTN, L).
T. RESUPINATUM L.—16; 25; 30 (LTN); 37 (L, GD); 63.
T. SCABRUM L.—63 (L).
T. STRIATUM L.—3; 12; 15; 30 (L); 37 (L); 62; 63 (L); 65.

T. SUBTERRANEUM L.—3 (W); 12 (L); 15; 16; 20; 30 (LTN); 31; 37 (GD); 59; 62; 63; 64; 80 (W). Often as var. OXALOIDES (Bunge) Rouy (see Lousley, 1949).

T. TOMENTOSUM L.—3 (W); 12 (K, L); 15; 16 (L); 17 (L); 30 (LTN); 31; 37 (GD, L); 63 (L); 64; 65.

TRIGONELLA AURANTIACA Boiss.—37, 1955 (GD, L).

T. COERULEA (L.) Ser.—63 (L).

VICIA ATROPURPUREA Desf.—30, 1951 (L); 37, 1956 (GD); 63 (L).

V. DASYCARPA Ten.—30 (LTN).

ZORNIA sp.—30 (W).

ROSACEAE

ACAENA ANSERINIFOLIA (J. R. & G. Forst.) Druce—30 (LTN), 37 (GD, L); 80 (K). Established in 3, 16, and 68 from wool-introduced plants (see Lousley, 1953, 1956).

A. HIERONYMA O. Kuntze—37, 1956.

A. INTEGERRIMA Gill.—30, 1954 (LTN, L).

CRASSULACEAE

CRASSULA MACRANTHA (Hook. f.) Diels & Pritzel—12 (K); 37 (K).

C. SIEBERIANA (Schultes) Druce—12 (K, L).

LYTHRACEAE

LYTHRUM HYSSOPIFOLIA L.—12 (K); 30 (LTN); 59 (L); 63; 79 (B).

L. JUNCEUM Banks & Sol.—16; 63 (L).

ONAGRACEAE

OENOTHERA DRUMMONDII Hook. forma—63 (L).

O. LACINIATA Hill.—30, 1959 (LTN, L); 63 (K, L).

O. STRICTA Ledeb.—30 (LTN, L); 37 (L).

HALORAGACEAE

MYRIOPHYLLUM VERRUCOSUM Lindl.—30, 1946 (LTN, L) (see Brenan & Chapple, 1949).

UMBELLIFERAE

AMMI MAJUS L.—3 (EXR); 12 (L); 15; 16; 30 (LTN); 37 (GD); 62; 63 (L); 64; 65.

A. VISNAGA Lam.—30 (LTN); 37 (GD, L).

ANETHUM GRAVEOLENS L.—37, 1958, 1959 (GD, L).

APIUM LEPTOPHYLLUM (Pers.) F. v. Muell.—30 (LTN); 37 (GD).

BUPLEURUM SEMICOMPOSITUM L.—63 (L).

CAUCALIS MELANANTHA (Hochst.) Hiern—65 (L).

DAUCUS CRINITUS Desf.—30, 1959 (LTN).

D.GLOCHIDIATUS (Labill.) Fisch., Mey. & Avé-Lall.—12 (K, L); 30 (LTN); 37 (GD); 63; 65 (L).

RIDOLFIA SEGETUM Moris—30, 1958 (LTN).
TORILIS AFRICANA Spreng.—65 (L).
T. LEPTOPHYLLA (L.) Reichb. (*Caucalis leptophylla* L.)—12; 30, 1956 (LTN); 37, 1957 (L).

CUCURBITACEAE

[CITRULLUS VULGARIS L.—63 (L) and CUCUMIS MELO L—63 (L) were growing with wool aliens on a sewage farm, and grow on sheep-runs in the southern hemisphere, but other means of introduction are possible.]
CUCUMIS MYRIOCARPUS Naud.—12 (K, L); 30, 1957 (LTN), 37, 1958 (L); 59; 63 (L); 64; 80 (B).
ECBALLIUM ELATERIUM (L.) A. Rich.—30, 1955 (*Herb. H. Bowen*).

POLYGONACEAE

FAGOPYRUM TATARICUM Gaertn.—30, 1959 (LTN).
POLYGONUM PATULUM Bieb.—30, 1951 (LTN, L).
P. PLEBEJUM R. Br.—30, 1954 (LTN, L); 63 (W).
P. SENEGALENSE Meisn.—37, 1955 (GD, L); 63 (L). (See Lousley, 1955).
RUMEX BROWNII Campd.—3 (L); 12 (K, L); 15; 30 (LTN); 37 (GD); 59; 62; 63 (L); 64; 65 (L); 80 (K).
R. CRYSTALLINUS Lange—63 (L).
R. DENTATUS subsp. HALACSYI (Rech.) Rech. f.—30, 1954 (LTN).
R. PULCHER subsp. DIVARICATUS (L.) Murbeck—30, 1950 (LTN, L), 37, 1958 (L); 63 (L); 65.
R. TENAX Rech. f.—12 (K, L).

URTICACEAE

GIRARDINIA CONDENSATA (Hochst. ex Steud.) Wedd.—5.
URTICA INCISA Poir.—12; 62 (K).

BORAGINACEAE

AMSINCKIA—British material is in course of revision.
A. INTERMEDIA Fisch. & Mey.—12 (L); 37, 1956 (L), 1959 (K); 63 (L).
A. MENZIESII (Lehm.) Nelson & Macbr.—12 (K); 80 (K).
ANCHUSA RIPARIA DC.—63 (L).
ASPERUGO PROCUMBENS L.—12 (L).
CYNOGLOSSUM AUSTRALE R. Br.—63 (L).
ECHIUM LYCOPSIS L. (*E. plantagineum* L.)—12 (L); 15 (L); 30 (LTN); 37 (GD, L); 62 (W); 64; 80 (B).
HELIOTROPIUM EUROPAEUM L.—18 (L); 30, 1956 (LTN); 37, 1958 (L); 63 (L).
LAPPULA ECHINATA Gilib.—30, 1956 (LTN); 37, 1957, 1958 (L); 63 (L); 79 (B); 80 (K).

CONVOLVULACEAE

Convolvulus erubescens Sims—37, 1958 (l).
Cuscuta campestris Yuncker—30, 1955 (l); 63, 1959, 1960 (l).

SOLANACEAE

Datura ferox L.—3 (k, exr); 12 (l); 15; 18 (l); 30 (ltn, gd); 37 (gd, l); 59; 63 (l); 64.
D. meteloides DC.—37, 1957 (l).
D. stramonium L. (including D. tatula L.)—3 (exr); 5; 11; 12 (l); 15; 16; 30 (ltn); 37 (gd); 59; 62; 63; 64; 79 (b).

Nicandra physalodes (L.) Gaertn.—5; 12 (l); 15; 30 (ltn); 37 (gd); 62; 63 (l); 64.

Nicotiana. All material of this genus is in need of revision in view of recent work in Australia.
N. goodspeedii Wheeler?—64 (l).
N. ingulba J. M. Black?—12 (l).
N. occidentalis Wheeler—30 (ltn, l).
N. rustica L.—65 (l).
N. suaveolens Lehm.—12 (k); 30, 1950 (ltn, l).
N. velutina Wheeler—12 (l); 63 (l).

Physalis acutifolia (Miers) Sandwith (*P. wrightii* A. Gr.)—30 (k). (See Sandwith, 1960).
P. ixocarpa Brot. ex Hornem.—3 (exr); 5; 11; 12 (l); 15; 16; 30 (ltn); 37 (gd); 59; 62; 63 (l); 64; 65; 79 (b).
P. peruviana L.—11 (l); 63 (l, w).

Solanum americanum Mill.?—37 (l); 63 (l).
S. curtipes Bitter—37, 1959 (l).
S. eleagnifolium Cav.—12 (l); 18 (l).
S. nigrum L.—3, 12; 30; 37; 59; 63; 64; 65. Many of the plants introduced with wool differ considerably from the usual British forms. The group to which *S. nigrum* belongs is much in need of revision on a world basis.
S. nitidibaccatum Bitter—12 (k); 37; 63. Specimens have been so named at Kew but most botanists in this country have been unable to separate this species from *S. sarrachoides* Sendtn.—see below.
S. nodiflorum Jacq.?—3 (l); 37 (l).
S. rostratum Dunal—15; 37, 1958 (l); 63 (l); 64.
S. sarrachoides Sendtn.—12 (l); 18 (l); 30 (ltn); 37 (gd); 62.
S. sisymbrifolium Lam.—12 (l); 30, 1954 (ltn, l).
S. torvum Swartz—11 (l).
S. triflorum Nutt.—18 (l); 30, 1955 (ltn); 37, 1956 (gd, l). Established in 68.

SCROPHULARIACEAE

CALCEOLARIA MEXICANA Benth.—80 (B).
C. TRIPARTITA Ruiz & Pav.—63 (K).
PARENTUCELLIA VISCOSA (L.) Caruel—80 (B).
VERBASCUM VIRGATUM Stokes—30, 1954 (LTN); 37, 1958; 64; 65.

MARTYNIACEAE

IBICELLA LUTEA (Lindl.) Van Eselt—64 (L). The fruits of this species and of *Proboscidea jussieui* Keller are not uncommon in imported wool but the latter has yet to be found growing in this country.

VERBENACEAE

VERBENA BONARIENSIS L.—12 (L); 30 (LTN); 37 (L); 59; 63 (L); 64.
V. MENTHAEFOLIA Benth.—30 (K); 63 (K). (See Townsend, 1961).
V. OFFICINALIS L.—64.
V. SUPINA L.—3 (K); 63 (L).
V. URTICAEFOLIA L.—63.

LABIATAE

MARRUBIUM VULGARE L.—3 (EXR); 12 (L); 15; 16; 30 (LTN); 37 (GD); 59; 62; 63 (L); 64; 80 (K).
SALVIA REFLEXA Hornem.—12 (L); 30 (LTN, GD); 37 (GD); 63 (L); 64. (See Sandwith, 1950.)

PLANTAGINACEAE

PLANTAGO CORONOPUS L.—80 (W). Probably common but unrecorded.
P. INDICA L.—37, 1955 (L).
P. VARIA R.Br.—37, 1960 (L).

RUBIACEAE

GALIUM SETACEUM Lam.—30, 1957 (LTN, L).
G. SPURIUM L.—63.

COMPOSITAE

ANACYCLUS CLAVATUS (Desf.) Pers.—37, 1957 (L).
A. RADIATUS Lois.—37 (GD).
ACANTHOSPERMUM AUSTRALE (Loefl.) Kuntze—30, 1954 (LTN, L).
ARTEMISIA AFRA Jacq.—30, 1951 (LTN, L).
A. ANNUA L.—59 (L).
A. BIENNIS Willd.—3 (K, EXR); 5.
A. DRACUNCULUS L.—30 (L).
BIDENS BIPINNATA L.—5; 11 (L); 12 (L); 15 (L); 30 (LTN, L); 37 (L, GD); 62; 63 (L); 64; 65; 79 (L).
B. FRONDOSA L.—15 (*Herb. R. A. Graham*); 30 (LTN, L); 37, 1955 (GD); 1957 (L).

B. PILOSA L.—5; 11 (L); 12 (L); 15; 16; 25; 30 (LTN); 37 (GD); 59; 62; 63; 64; 65.

B. VULGATA Greene—12 (L); 30, 1958 (L); 37, 1957 (L). (See Young, 1957.)

BRACHYCOME CILIARIS (Labill.) Less. ?—63 (L).

B. GRAMINEA (Labill.) F. v. Muell.—63 (L).

CALOTIS CUNEIFOLIA R.Br.—12 (K, L); 15; 16 (L); 30 (K, LTN, L); 37 (GD, L); 63 (L); 64; 65 (L). (See Lousley, 1955b.)

C. DENTEX R.Br.—30, 1950 (K, L).

C. HISPIDULA F. v. Muell.—12 (K, L); 16; 30 (LTN, GD); 37 (K, GD, L); 63 (L); 65 (L).

C. LAPPULACEA Benth.—3 (K, EXR); 15 (K, L); 30, 1952 (K, LTN), 1959 (L); 63 (L).

C. SQUAMIGERA C. T. White (*C. hispidula* var. *sessiliceps* Thell.)—12 (K); 37 (L).

CARDUUS ARGENTATUS L.—30, 1954 (LTN, L); 65.

C. PYCNOCEPHALUS L.—12 (K); 15; 16; 30 (L); 37, 1955, 1960 (L); 63; 65 (L).

C. TENUIFLORUS Curt.—12 (L); 16 (L); 30 (LTN); 37 (GD); 65; 80 (K).

CARTHAMUS LANATUS L.—12 (L); 15; 16 (L); 25; 30 (LTN); 37 (GD); 59; 62 (L); 63 (L); 64; 65; 79 (B).

var. CRETICUS (L.) Halacsy—37 (GD); also grown from shoddy (K).

CENIA TURBINATA Pers. (including var. PUSILLA Schlecht.)—12 (K, L); 63 (L); 64.

CENTAUREA CALCITRAPA L.—12 (W); 30 (LTN); 37 (GD); 59 (L); 63 (L); 64; 65; 80.

C. DILUTA Ait. f.—5; 30, 1957 (LTN); 37, 1958 (L); 63 (L).

C. MELITENSIS L.—3 (EXR); 12 (L); 30, 1946 (LTN); 37 (GD); 59 (L); 63; 65; 80 (W).

C. SOLSTITIALIS L.—12 (L); 15; 16; 30 (LTN); 37 (GD); 64.

C. REPENS L. (*Acroptilon repens* (L.) DC.)—36 (K, L). (See Lousley, 1960.)

CHRYSANTHEMUM CORONARIUM L.—30, 1956 (LTN).

CHRYSOCOMA TENUIFOLIA Berg.—12 (K); 15 (L); 30 (L); 63 (K, L).

CICHORIUM PUMILUM Jacq. (including var. ENDIVIA (L.) Täckholm)—30, 1957 (LTN); 37, 1955 (L).

[COREOPIS TINCTORIA Nutt.—37, 1959 (K, L).]

COSMOS BIPINNATUS Cav.—12 (L); 15 (L).

COTULA AUSTRALIS (Spreng.) Hook. f.—3 (K, L), established since 1946; 15; 30, 1950 (LTN); 37, 1959 (L).

C. CORONOPIFOLIA L.—63 (L); 79 (B).

C. SQUALIDA Hook.—63, 1953 (L).

C. ZEYHERI Fenzl—63 (K).

CRYPTOSTEMMA CALENDULACEA (L.) R.Br.—3 (L); 12 (L); 18 (L); 30, 1954 (LTN, GD); 62; 63 (L); 64; 65; 80 (K).

DICHROCEPHALA INTEGRIFOLIA (L.) O. Kuntze—12 (K, W, L).

ERIGERON BONARIENSIS L.—3 (EXR); 12 (L); 15; 30 (LTN); 37 (L); 59; 62; 63 (L); 64; 65 (L); 80 (W).

GALINSOGA CILIATA (Raf.) Blake—15.

G. PARVIFLORA Cav. Occurs frequently in the company of wool aliens but records not kept.

GNAPHALIUM JAPONICUM Thunb.—12 (K, L).

G. LUTEOALBUM L.—12 (K); 63 (L); 64; 65 (L).

G. UNDULATUM L.—12 (L).

HEDYPNOIS RHAGADIOLOIDES var. CREPIFORMIS (Reichb.) Rouy—12 (K).

HELIANTHUS ANNUUS L.—11; 63.

HELICHRYSUM BRACTEATUM (Vent.) Willd.—79 (B).

HELIPTERUM CORYMBIFLORUM Schlect.—37, 1954 (GD).

H. FLORIBUNDUM DC.—12 (L).

HYPOCHOERIS GLABRA L.—12 (L); 30 (LTN); 37 (GD, L); 63 (L); 65; 80 (K).

INULA GRAVEOLENS (L.) Desf.—12 (K, L); 15; 30 (LTN); 37 (GD, L); 63 (L); 64; 65.

LASIOSPERMUM PEDUNCULARE Lag.—30, 1951 (LTN, L, GD).

MADIA SATIVA Molina—30, 1950 (LTN).

[ONOPORDUM ACANTHIUM L.—37, 1958 (L).]

PODOLEPIS LONGIPEDATA A. Cunn.—37 (K); 63 (L). The Yorkshire specimen is an annual with a slender root and the identification must be treated as tentative.

PULICARIA ARABICA (L.) Cass.—37, 1960 (L).

SCHKUHRIA PINNATA (Lam.) Thell.—12 (L); 15 (L); 25; 30 (LTN); 37 (GD); 63 (L); 65. (See Sandwith, 1942).

SCOLYMUS MACULATUS L.—37, 1958 (L).

SENECIO ARENARIUS Thunb.—30, 1951 (LTN).

S. BIPINNATISECTIS Belcher—30, 1959 (LTN).

S. GLOSSANTHUS (Sond). Belcher—12 (L); 63 (L).

S. INAEQUIDENS DC.—5; 12 (K); 15; 30 (LTN, L); 37 (L); 63 (L); 64; 79 (L); 80 (L). These plants belong to a complex, represented in Australia as well as South Africa, which presents extremely difficult taxonomic problems. I am confident that much of our material is identical with *S. inaequidens* DC. as understood in South Africa, and specimens sent to the National Herbarium, Pretoria, have been carefully compared there and confirmed (Lousley, 1953b and 1954). Similar material was previously identified as *S. lautus* (Sol. ex Forster) A. Richard which is a New Zealand endemic (Ornduff, 1960) although the name has often been used incorrectly for a polymorphic plant widespread in Australia. No doubt the Australian "*S. lautus*" occurs as a wool alien in this country but this may include more than one species and the relationship to the numerous species described from the parallel complex in South Africa is far from clear. While *S. inaequidens* appears to be the commonest representative of the group in Britain, and has a tendency to become established, other species also occur and still await determination.

S. PTEROPHORUS DC.—30 (L); 37 (L); 63 (L).

SIEGESBECKIA ORIENTALIS L.—12 (K, L); 15 (L); 30, 1954 (LTN); 1956 (L); 37 (GD); 64.

SILYBUM MARIANUM (L.) Gaertn.—3; 12 (L); 15; 30 (LTN); 37, 1956; 62; 63; 64.

SOLIVA ANTHEMIFOLIA (Juss.) R. Br.—12 (K, L); 37 (K, GD, L); also grown from shoddy (W).

S. PTEROSPERMA Juss.—12 (K).

STUARTINA HAMATA W. R. Philipson—12 (K, L).

TAGETES MINUTA L.—3 (EXR); 5; 11 (L); 12 (L); 15 (L); 16 (L); 20; 25; 30 (LTN); 31; 37 (GD); 59; 62; 63 (L); 64.

UROSPERMUM PICROIDES (L.) F. W. Schmidt—37, 1958 (K, L).

VERBESINA ENCELIOIDES (Cav.) A. Gray—12 (K); 30, 1956 (LTN); 37 (GD); 63 (L); 64.

VITTADINIA TRILOBA (Gaudich.) DC. var. TRILOBA—12 (K, L); 30, 1958 (LTN).

XANTHIUM AMBROSIOIDES Hook. & Arn.—30 (LTN, L); 37 (GD, L); 63 (L).

X. CHINENSE Mill.—5.

X. SPINOSUM L.—3 (EXR); 5; 11; 12 (L); 13; 15 (L); 16 (L); 17; 18 (L); 25; 30 (LTN); 37 (GD); 59; 62; 63; 64; 79 (B); 80 (W).

X. STRUMARIUM L.—11; 25; 30 (LTN, L); 37, 1953 (GD).

LILIACEAE

ASPHODELUS FISTULOSUS L.—37, 1958 (GD, L).

JUNCACEAE

JUNCUS BUFONIUS L.—65 (L). This was a form which could be matched with Australian specimens. It is probably common as a wool alien but unrecorded on account of its occurrence also as a native in the same places.

J. PALLIDUS R. Br.—21 (L); 30 (LTN, L). (See Lousley, 1947, and Dony, 1953.) Extremely complex populations of *Juncus* have occurred in gravel pits in Bedfordshire and Middlesex and include plants likely to have arisen as hybrids between *J. pallidus* and native *J. effusus* L. and *J. inflexus* L. Some match closely foreign material named, for example, *J. vaginatus* R. Br., *J. radula* Buchenau, and *J. procerus* E. Mey. Plants of alien *Junci* also occur in v.-c. 63 but all these plants require further study before names can be applied with confidence.

CYPERACEAE

Cyperus eragrostis Lam. (*C. vegetus* Willd.)—63 (l); 64.
C. vaginatus subsp. gymnocaulos (Steud.) Kük.—63 (l).

GRAMINEAE

Aegilops biuncialis Vis.—37, 1958 (k).
[Agropyron attenuatum (Humb., Bonpl. & Kunth) Roem. & Schult. Grown from Uruguay wool from Bradford (l).]
A. scabrum (R. Br.) Beauv.—30, 1957 (ltn); 37, 1958 (l); 59 (l).
Agrostis aemula R. Br.—37, 1955 (k).
A. avenacea J. F. Gmel.—12 (k, l); 15; 16; 30 (ltn); 37 (k, gd.); 59; 62; 63 (k, l); 64; 65; 80 (k).
A. hiemalis (Walt.) Britton, Sterns & Poggenb.
A. lachnantha Nees—12 (k); 30 (ltn); 37 (gd); 59 (l); 62; 63 (k, l); 64.
A. semiverticillata (Forsk.) C. Chr.—3 (exr, l); 15; 37, 1957 (gd).
Aira caryophyllea L.—15 (l); 37 (gd, l); 80 (w).
A. cupaniana Juss.—37, 1952 (gd, l).
A. elegans Gaud.—37, 1957 (l); 63 (l).
A. provincialis Jord.—63 (l).
Alopecurus geniculatus L.—37, 1955 (l); 1960 (k); 80 (k).
A. pratensis L.—63 (l).
Amphibromus neesii Steud.—12 (l); 30, 1954 (l); 37, 1954 (gd, l); 63 (l).
Apera intermedia Hack.—15 (l).
A. spica-venti (L.) Beauv.—37 (l); 64.
Aristida adscensionis L.—37, 1958 (l).
Avena fatua L.—12; 62; 63.
A. sterilis L.—37, 1957.
A. strigosa Schreb.—37, 1952 (gd).
Bothriochloa insculpta (Hochst.) A. Camus—12 (l).
Brachypodium distachyum (L.) Beauv.—30, 1950 (k); 37, 1956 (k, l); 63 (l).
Briza maxima L.—30, 1959 (ltn, l).
Bromus alopecuros Poir.—37, 1955 (gd).
B. alopecuroides Poir.—3 (k); 65 (l).
B. arenarius Labill.—3 (k, w); 30, 1960 (k); 62 (k).
B. brevis Nees—37 (k, gd); 63 (l); 80 (k, w).
B. carinatus Hook & Arn.—30, 1954 (k, l).
B. diandrus Roth (*B. gussonii* Parl.)—11; 12; 15 (l); 25 (l); 30, 1958 (ltn); 37 (gd); 62; 63 (l); 64; 65; 80 (k).
B. ferronii Mabille—30, 1946 (ltn).
B. inermis Leyss.—64 (l).
B. intermedius Guss.—37, 1958 (l); 65 (l).

B. JAPONICUS Thunb. (including var. VELUTINUS (Koch) Aschers. & Graeb.)—30, 1955 (LTN); 37, 1957 (K); 63 (L).

B. MACROSTACHYS var. LANUGINOSUS (Poir.) Boiss.—3 (L); 65 (L).

B. MADRITENSIS L. (including var. CILIATUS Guss.)—3 (K); 5; 12 (L); 3 (K); 5; 12 (L); 30; 37 (GD, L); 63 (K); 65 (L).

B. MOLLIFORMIS Lloyd—12 (K); 15; 37, 1958 (GD); 63 (L).

B. MOLLIS L.—15; 16; 63 (K, L); 65 (L); 80 (K).

B. RIGIDUS Roth.—30, 1956 (LTN); 63 (L); 65.

B. RUBENS L.—12 (K, L); 15 (L); 30 (LTN); 37 (GD); 62; 63 (L, GD); 65; 80 (W).

B. SECALINUS var. HIRTUS Aschers. & Graebn.—65 (L).

B. SCOPARIUS L.—12 (K); 30 (LTN); 37 (GD); 63 (K, L).

B. STERILIS L.—79 (L). Probably more common but unrecorded.

B. TECTORUM L. (including var. HIRSUTUS Regel)—15; 25 (L); 30, 1946 (LTN); 37, 1958 (L).

B. TRINII Desv.—37, 1955 (K).

B. WILLDENOWII Kunth (*B. unioloides* Kunth)—5; 12 (L); 15; 25; 30 (LTN); 37 (GD); 59; 63 (L); 64; 65; 80.

CENCHRUS CILIARIS L.—30, 1954 (K).

C. PAUCIFLORUS Benth.—37, 1955 (K, L).

C. SETIGERUS Vahl—37, 1958 (L).

C. TRIBULOIDES L.— 63 (L).

CHLORIS ACICULARIS Lindl.—12 (L).

C. DIVARICATA R.Br.— 3; 12 (L); 30 (L); 37, 1955 (GD, L), 1959 (K); 63 (L).

C. PYCNOTHRIX Trin.—5; 12 (K, L).

C. TRUNCATA R.Br.—3 (EXR); 12 (K, L); 15; 30 (LTN); 37 (K, GD, L); 63 (L).

C. VENTRICOSA R.Br.—12 (K, L); 37, 1953 (L).

C. VIRGATA R.Br.—12 (K, L); 15 (L); 30 (L); 37 (K, GD, L); 63 (L).

CRITHOPSIS DELILEANUS (Schult.) Roshev.—37, 1956 (GD, L);

CYNODON DACTYLON (L.) Pers.—25; 30 (L); 37, 1959 (K), 1960 (K, GD, L); 63 (L).

C. HIRSUTUS Stent—37, 1959 (K); 63 (L).

C. INCOMPLETUS Nees—12 (L); 30 (LTN); 37 (K, GD); 63 (L). (See Lousley, 1958b.)

CYNOSURUS CRISTATUS L.—15 (L); 30 (L).

C. ECHINATUS L.—15 (L); 30 (L); 37.

DACTYLIS GLOMERATA L.—63 (L). This appears frequently from shoddy cultures and is probably common.

DACTYLOCTENIUM RADULANS (R.Br.) Beauv.—12 (K, L); 15 (L); 16 (L); 30 (LTN); 31 (K); 37 (K, GD, L); 63 (L).

DANTHONIA CAESPITOSA Gaud.—30, 1950 (K, L); 63 (L).

D. PENICILLATA (Labill.) F. v. Muell.—16 (L); 30 (L).

D. RACEMOSA var. OBTUSATA F. v. Muell. ex Benth.—12 (K).

D. SETACEA R.Br.—37 (L).

Dichanthium sericeum (R.Br.) A. Camus—12 (l); 30, 1958 (k, ltn, gd); 37, 1958 (l).

Digitaria adscendens (Humb., Bonpl. & Kunth) Henrard—30 (l); 37, 1955 (k, gd), 1959 (k).
D. didactyla Willd.—16, 1948 (l).
D. exasperata Henrard—37 (k).
[D. ischaemum (Schreb.) Muhl.—Has been grown from shoddy collected in 30 (l) and 37 (l).]
D. sanguinalis (L.) Scop.—3 (w); 11 (l); 12 (l); 30 (k, ltn); 37 (k, l); 64 (l).
subsp. vulgaris var. rottleriana Henrard—37 (k).

Diplachne fusca (L.) Beauv.—12 (l); 16 (l); 30 (ltn); 37 (k, gd, l); 63 (l).
D. muelleri Benth.—37 (l).

Echinochloa colonum (L.) Link.—37 (k, gd, l); 63.
E. crus-galli (L.) Beauv.—3 (exr); 5; 12 (l); 15; 25; 30 (ltn); 31; 37 (k, gd, l); 59; 62; 64.
E. pungens (Poir.) Rydb.—37, 1958 (gd).

Ehrharta longiflora Sm.—30, 1957 (l); 63 (k, l).

Eleusine africana O'Byrne—3 (exr); 5; 11 (l); 12 (l); 15 (l); 16; 30 (ltn); 37 (gd, l); 63 (l). (See O'Byrne, 1957, and Kent, 1958.)
E. floccifolia (Forsk.) Spreng.—5 (*Herb. C. C. Townsend*).
E. multiflora Hochst.—12 (k); 30, 1950 (l); 37, 1959 (k, gd, l).

Elymus virginicus L.—63 (k).

Eragrostis barrelieri Daveau—30, 1959 (ltn); 37, 1958.
E. brownii (Kunth) Nees—37, 1955 (k, gd, l).
E. chloromelas Steud.—12 (k); 37, 1959 (k); 63 (l).
E. cilianensis (All.) Vign.-Lut.—12 (l); 15; 16; 30 (l); 37 (gd, l).
E. curvula (Schrad.) Nees— 12 (k); 15 (l); 37, 1959 (l); 63 (l).
E. dielsii Pilg.—30, 1959 (ltn, l).
E. leptostachys (R.Br.) Steud.—37 (l); 63 (l).
E. obtusa Munro—37, 1959 (k, l).
E. parviflora (R.Br.) Trin.—12 (l); 30 (ltn); 37, 1959 (k, gd, l).
E. poaeoides Beauv.—12 (w); 30 (l); 37, 1959 (l).
E. teff (Zuccagn.) Trotter—5 (k); 12 (k); 37 (l); 63 (l).

Eriochloa crebra S. T. Blake—37, 1950 (gd), 1959 (k).
E. gracilis (Fourn.) Hitch.—37, 1958.
E. pseudo-acrotricha (Stapf) Hubbard—12 (k, l); 30, 1959 (k, ltn); 37 (l); 63 (l).

Gastridium phleoides (Nees & Meyer) C. E. Hubbard—12 (k, l); 37, 1955 (l); 63 (l).

Glyceria multiflora Steud.—30, 1954 (k, l); 37, 1957 (l).
G. plicata Fr.—37 (l).
G. spicata Guss.—30, 1956 (l); 37, 1957.

Harpachne schimperi Hochst. ex A. Rich.—12 (L).

Holcus lanatus L.—63 (L). Common in cultures from shoddy.

Hordeum compressum Griseb.—37 (L).

H. euclaston Steud.—37 (GD, L).

H. flexuosum Nees ex Steud.—63 (K); 64 (L).

H. glaucum Steud.—12 (K, L); 15; 16; 17; 30 (LTN); 37 (K, GD); 59; 62 (L); 63 (L); 64; 65; 80 (K). (See Dony, 1955, and Hubbard, 1955.)

H. hystrix Roth—12 (L); 15; 16; 30 (LTN); 37 (GD); 62 (K); 63 (L); 65; 80 (K).

H. jubatum L.—30 (LTN); 37 (GD); 63 (L); 64.

H. leporinum Link.—15; 30 (LTN); 37 (GD); 62 (L); 63 (L); 65. (See Dony, 1955.)

H. marinum Huds.—16 (L); 30 (LTN); 63 (K).

H. murinum L.—15; 16; 30 (L); 37; 63. No doubt more commonly introduced than these records indicate.

H. muticum Presl—37, 1958 (L).

H. pubiflorum Hook. f. (including var. pampeanum (Haum.) Melderis)—37 (L); 63 (K, L).

H. pusillum Nutt. (including var. pubens Hitchcock)—12 (L); 15 (L); 30 (LTN); 37, 1958 (L); 63 (K, L). (See Dony, 1955).

H. violaceum Boiss. & Heldr.—63 (K); 64? This has been confused with *H. pubiflorum* which also sometimes has violet-coloured spikes.

Koeleria phleoides (Vill.) Pers.—12 (L); 15 (L); 30, 1952 (LTN); 37 (GD); 63 (L); 65; 80 (W).

Lamarckia aurea (L.) Moench.—3 (K, EXR); 30, 1959 (LTN); 37, 1957 (GD, L); 63 (L).

Leptochloa peacockii (Naud. & Betche) Domin—12 (K).

L. squarrosa Pilg.—12 (L).

Lolium loliaceum (Bory & Chaub.) Hand.-Mazz.—30, 1954 (LTN); 37, 1954 (GD); 63 (L).

L. multiflorum L.—37 (GD); 63 (L).

L. perenne L.—30 (L); 37 (L). Common in cultures from shoddy and probably much more frequent as a wool alien than these records suggest.

L. rigidum Gaud.—3 (W); 12 (K, L); 15; 30, 1954 (LTN); 37 (GD); 59; 63 (L); 65; 80 (K).

L. temulentum L. (including var. arvense With.)—3; 12; 30 (LTN); 37; 63 (L).

Microleana stipoides R. Br.—30, 1959 (K, LTN); 63 (K, L).

Nassella trichotoma (Nees) Hack.—30, 1955 (LTN, L. GD).

Oryzopsis miliacea (L.) Benth. & Hook.—30, 1957 (LTN); 37, 1959 (K); 63 (L); 64 (K).

Panicum buncei F. v. Muell.—12 (K); 37 (K).

P. capillare L.—17; 30, 1955 (LTN).

P. decompositum R. Br.?—37 (L).

P. LAEVIFOLIUM Hack.—5 (K); 11 (L); 12; 30 (LTN); 37, 1953 (GD, L); 59; 63 (K, L); 64 (L).

P. SUBALBIDUM Kunth (*P. longijubatum* Stapf)—30 (L).

PASPALIDIUM JUBIFLORUM (Trin.) Hughes—30 (LTN, L).

PASPALUM DILATATUM Poir.—30, 1959 (K, LTN, L, W).

PENTASCHISTIS AIROIDES (Nees) Stapf—12 (K); 37, 1957 (K).

PHALARIS ANGUSTA Nees—37, 1955 (GD, L).

P. BRACHYSTACHYS Link—15 (L); 30, 1959 (*Herb. H. Bowen*); 37, 1960 (L); 59 (K); 62 (W); 63 (L); 64 (L).

P. MINOR Retz—5; 12 (K, L); 15; 16; 30 (LTN); 37 (GD); 59; 63; 64; 65; 79.

P. PARADOXA L. (including var. PRAEMORSA Coss. & Dur.)—3 (W); 5; 12 (K, L); 15; 16 (L); 30 (LTN); 37 (GD); 62 (L) 63 (L); 65 (L).

P. TUBEROSA L.—37 (GD, L); 59 (L); 62; 63 (L); 64 (L).

PHLEUM PRATENSE L.—37, 1959 (L); 65.

POA AUSTRALIS R. Br.—37, 1956 (GD, L).

P. COMPRESSA L.—37 (K).

P. LEPTOCLADA Hochst.—63 (K).

P. PALUSTRIS L.—37 (GD, L).

POLYPOGON ELONGATUS Humb., Bonpl. & Kunth—37, 1955 (K).

P. MARITIMUS Willd.—15 (L); 30 (L); 37, 1955 (GD), 1958 (L); 63 (L).

P. MONSPELIENSIS (L.) Desf.—3 (EXR, L); 5; 12 (K); 15; 16; 30 (LTN); 37 (GD); 59 (K); 62; 63 (L); 64 (L); 65; 79 (L); 80 (K).

[P. TENELLA R. Br. has been grown from shoddy (K).]

PUCCINELLIA DISTANS (L.) Parl.—63 (K, L). This differs considerably from our native plant.

RHYNCHELYTRUM VILLOSUM (Parl.) Chiov.—30 (K).

SCHISMUS BARBATUS (L.) Thell.—12 (W); 30 (L); 37 (K, GD, L).

SCHMIDTIA KALAHARIENSIS Stent—15 (L); 30, 1959 (LTN, L, GD).

SECALE CEREALE L.—3; 12.

SETARIA GENICULATA (Lam.) Beauv.—30, 1959 (K, L, W).

S. LUTESCENS (Weigel) Hubbard (*S. glauca* (L.) Beauv.)—5; 30, 1953 (LTN); 31; 37, 1958 (GD).

S. PALLIDE-FUSCA (Schum.) Stapf & Hubbard—63 (L).

S. VERTICILLATA (L.) Beauv.—3 (EXR); 5; 11 (L); 12 (L); 15; 30 (LTN); 31; 37 (GD); 63 (L); 64.

S. VIRIDIS (L.) Beauv.—11; 12; 30 (LTN); 37 (GD); 63 (L).

SNOWDENIA POLYSTACHYA (Fresen.) Pilger—5 (K, L, W).

SORGHUM HALEPENSE (L.) Pers.—30 (K); 37, 1958 (GD, L); 63 (L).

S. VULGARE Pers.—12; 15 (L).

SPOROBOLUS AFRICANUS (Poir.) Robyns & Tournay—12 (L); 30, 1958 (LTN); 37, 1959 (K, L); 63 (L).

S. ELONGATUS R.Br.—63 (L).

S. IOCLADOS Nees—63 (L).

Stipa capensis Thunb. (*S. tortilis* Desf.)—30, 1959 (K, LTN, L, W); 37 (L).

S. dusenii Hitch.?—37, 1956, 1958 (GD, L).

S. formicarum Delile—37, 1960 (K).

S. hyalina Nees—30, 1954 (K).

S. neesiana Trin. & Rupr.—37, 1956 (L); 63 (K, W).

S. variabilis Hughes—37 (L); 63 (K). Grown from shoddy (K).

S. verticillata Nees—12 (L); 37, 1955 (GD, L); 63 (L).

Taeniatherum crinitum (Schreb.) Nevski—37, 1956 (K, L).

Tragus australiensis S. T. Blake—12 (L); 30; 37 (K, GD, L). Difficulty has been found in distinguishing this from *T. racemosus* and the records of both species may require revision.

T. berteronianus Schult.—30 (L, *Herb. J. P. M. Brenan*); 37, 1959 (K).

T. koelerioides Aschers.—30 (*Herb. R. A. Graham*); 63 (L).

T. racemosus (L.) All.—12 (K, L); 15; 16; 30 (LTN); 31; 37 (GD, L); 63 (K).

Triraphis mollis R.Br.—12 (L); 37, 1959 (L).

Vulpia alopecuros (Schousb.) Link—63 (L); 64 (L).

V. australis (Nees ex Steud.) Blom—15 (L); 37 (L).

V. bromoides (L.) Gray—3; 12 (L); 15; 16; 30 (LTN); 37 (GD); 62; 63 (L); 80 (W).

V. ciliata (Danth. ex DC.) Link—63 (L).

V. geniculata (L.) Link—30 (LTN); 37, 1956 (K, GD, L); 63 (L).

V. myuros (L.) C. C. Gmel.—3; 12 (K); 15; 37 (GD, L); 62; 63 (L); 64; 65 (L); 80 (W).

V. megalura (Nutt.) Rydb.—12 (L); 15 (*Herb. D. H. Kent*); 30, 1955 (LTN, GD); 37, 1955.

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NARDURUS MARITIMUS (L.) MURB. IN BRITAIN

By Clive A. Stace

1. Introduction and Description

This grass has been found in a sufficient number of places in the past few years in England to be considered, at least by some, a native.

In habit, the slender upright culms, bearing a narrow long-awned one-sided panicle, resemble those of certain other British grasses, notably *Vulpia* species. It also bears a superficial resemblance to *Nardus stricta* L., from which it is easily distinguished by its lax annual (not stiff and densely tufted perennial) habit, and by its spikelet characters, which are typical of the Festuceae to which it belongs, i.e., spikelets with several pinnately arranged florets (not one-flowered as in *Nardus*).

Since a description of *Nardurus maritimus* does not appear to have been previously published in English, one is given here. It has been compiled both from living and herbarium material of British plants which the author has examined.

Description of Nardurus maritimus (L.) Murb. (See Fig. 1.)

Plant annual; mostly glabrous, smooth or somewhat scabrous in the upper parts; variously suffused with purplish colour—usually present at base of culms on stems and sheaths, occasionally reaching the panicle axis or even the glumes. *Culms slender,* solitary or few and then loosely tufted, 3 to about 40 cm. high, erect or ascending or sometimes geniculate at the base; nodes 2-3, blackish or purplish-brown. Leaf-sheaths wider than the blade when opened out, subglabrous, smooth; ligule short, up to 1 mm. long, truncate, equally lengthed along its width, membranous; leaf-blades green or sometimes purplish, soon browning, short, 1-4 cm. long, the upper ones shorter than the lower, narrow, more or less pointed, not stiff, inrolled usually, glabrous without, shortly pubescent within.

Panicle far exserted from topmost sheath at anthesis, *very narrow and slender*, erect or slightly nodding in taller specimens, 1-10 cm. long, usually more or less one-sided, with c. 3-18 *spikelets nearly always borne singly at each node.* Rhachis green or purplish, angular, slightly scabrous.

Spikelets stalked; peduncle stout, very slightly thickened at apex, 1-1·5 mm. long; rest of spikelet 4-7 mm. long (excl. awns), 3-6 flowered, readily breaking up at maturity below each floret. *Glumes* 2, shorter than the lowest lemma on each side, unequal, narrowly lanceolate and very finely pointed, rather obscurely nerved, smooth on the back; *lower 1·5-3·5 mm. long, 1-nerved; upper 3-5 mm. long, 3-nerved.* *Lemmas* greatly overlapping, ovate-lanceolate, inrolled around palea, *2-4 mm. long,* tipped with

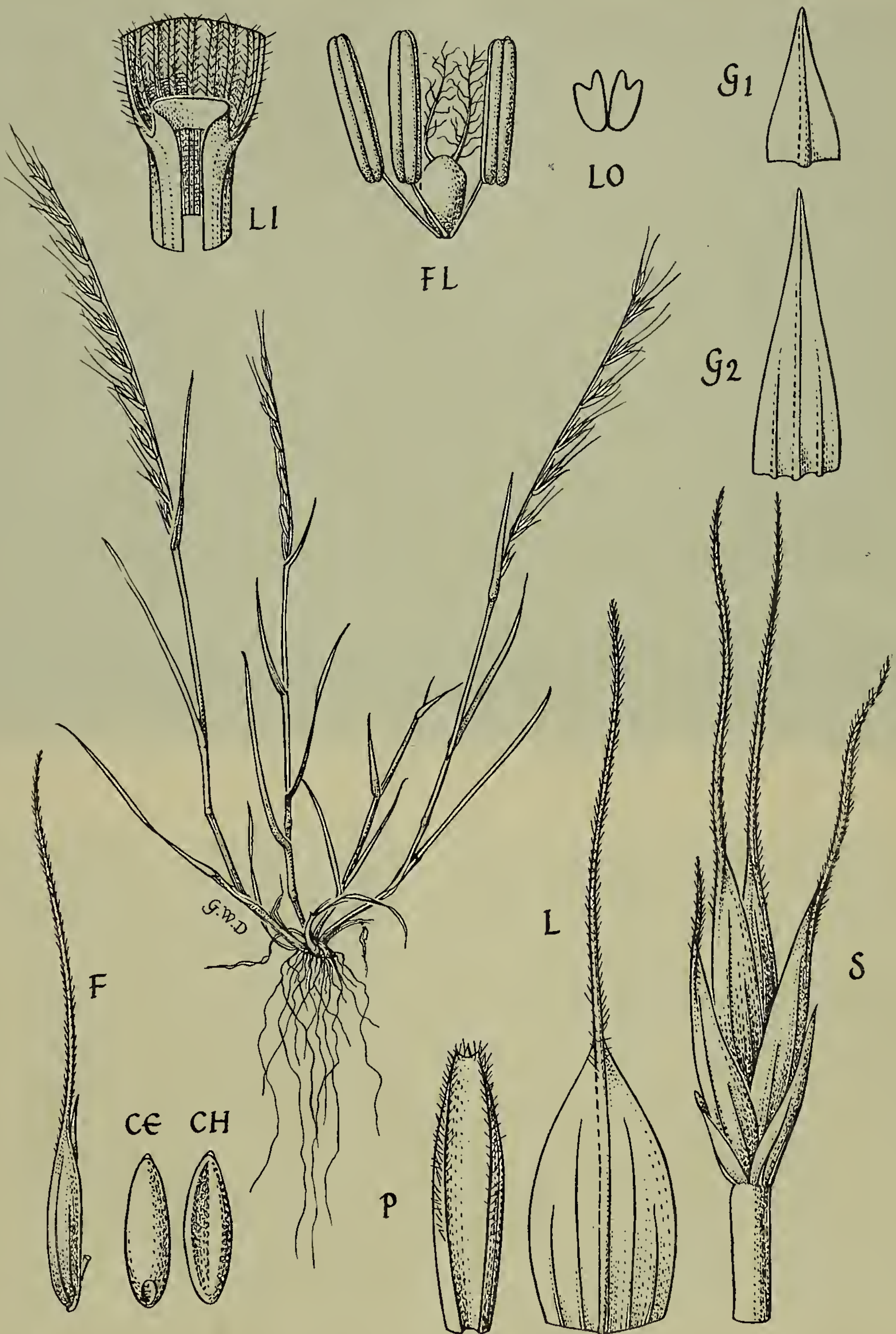

FIG. 1—NARDURUS MARITIMUS (L.) Murb.

General Habit × 1½; Ligule (LI) × 13½; Spikelet (S) × 9; Lower Glume (G_1) × 13½; Upper Glume (G_2) × 13½; Lemma (L) × 13½; Palea (P) × 13½; Flower (FL) × 27; Lodicules (LO) × 27; Floret (F) × 9; Caryopsis, back view (CE) × 9; Caryopsis, front view (CH) × 9.

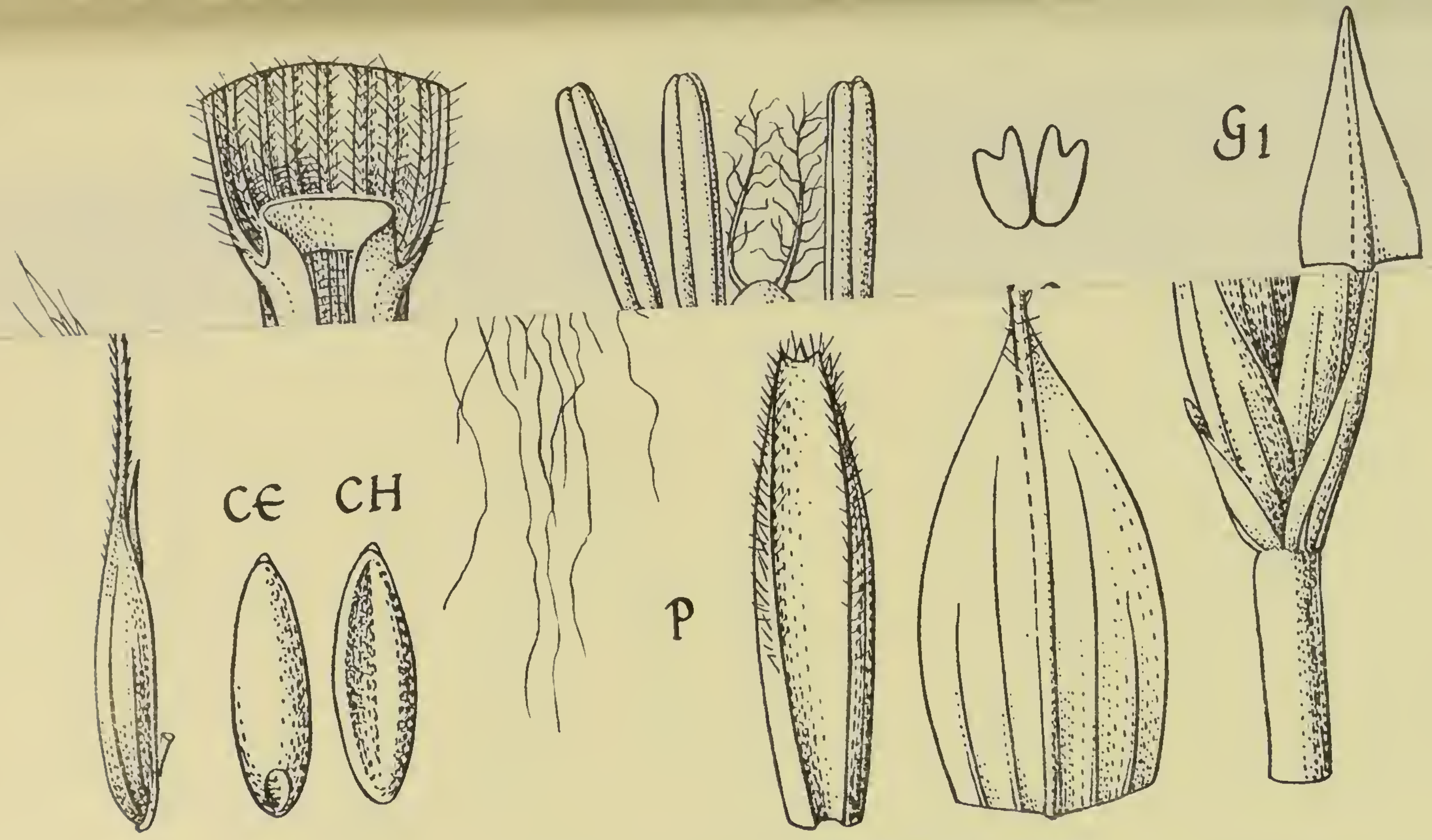

FIG. 1—NARDURUS MARITIMUS (L.) Murb.

General Habit × 1½; Ligule (LI) × 13½; Spikelet (S) × 9; Lower Glume (G_1) × 13½; Upper Glume (G_2) × 13½; Lemma (L) × 13½; Palea (P) × 13½; Flower (FL) × 27; Lodicules (LO) × 27; Floret (F) × 9; Caryopsis, back view (CE) × 9; Caryopsis, front view (CH) × 9.

a minutely scabrous *awn up to 5 mm. long* (very often longer than the lemma), 5-nerved, minutely scabrous on back with spinules apically directed. Palea slightly shorter or as long as lemma, lanceolate, pointed and then very slightly notched at apex, with two raised green keels, hyaline in the midline and at the edges, keels scabrous with apically directed hairs. *Stamens 3*; anthers 0·75-1·25 mm. long, exserted at anthesis (*fls. chasmogamous*). Grain enclosed by the palea and the inrolled lemma, usually still attached to the next higher internode of the spikelet axis, small and narrow, c. 2·5 × 0·5 mm., obtuse, smooth and glabrous.

Nardurus maritimus is thus seen to differ from *Vulpia* in its three-anthered chasmogamous flowers, in its simple panicle, and in its shorter lemmas. In *Vulpia* there is usually only one anther (although there may be two or three) and the lemmas (often greatly) exceed 4 mm., at least in the British species. It may usually be distinguished from the four British species of *Vulpia* by its much slenderer habit, but it may rather closely resemble some forms of *V. ambigua* (Le Gall) More (which differs additionally from *Nardurus* in its one-nerved upper and nerveless lower glume), of *V. myuros* (L.) C. C. Gmel. which differs further in the lower glume being only one-sixth to one-half as long as the upper, and of *V. bromoides* (L.) Gray (which may sometimes differ only in its longer lemmas and single anther).

The identity of the Linnaean plant, *Festuca maritima* L., with the present species is discussed by Hubbard (1936). It was first transferred from this genus to *Nardurus* (which had already been made for other species formerly included in *Festuca*) by Murbeck (1900). *Nardurus* and *Vulpia* differ from *Festuca* in being annuals rather than perennials.

Continental and British authors in the past have used a considerable number of synonyms for *N. maritimus* (L.) Murb. The plant has been referred to most frequently by the following specific and varietal epithets: *unilateralis, tenella, hispanica, tenuiflora*, and *tenuiflora* var. *aristata*. Authorities and citations are not included as it appears that some work is needed on the genus as a whole in order to discover which names are true synonyms and which are misapplications to our plant. The genus consists of about four or five species widely distributed throughout the North Temperate Old World, from Portugal to East Asia.

Besides *N. maritimus*, a second species, *N. salzmannii* Boiss.,* has been recorded from Britain, as a casual (*Rep. Bot. Soc. & E.C.*, **4**, 1916). This species differs from *N. maritimus* in having awnless lemmas and obtuse glumes, and in general habit the very slender culms resemble those of a *Parapholis* rather than of *Nardus* or *Vulpia*. It is a native of S. France and Spain, and of N. Africa. There appears to be only one British record, namely: "Esparto grass alien, near Musselburgh, Midlothian, v.c. 83, July

*A good illustration of *N. salzmannii* is given in *Voyage Botanique dans le Midi de l'Espagne*, vol. **1**, 178, 1839-45, by E. Boissier.

18th, 1914, J. Frazer". A specimen with these details is present in Hb. J. E. Lousley. The published record, however, gives 1915.

2. HISTORY AND RECORDS

Nardurus maritimus was first recorded in Britain in S. Lincoln (v.c. 53) on 9th June 1903, on an excursion of the Lincolnshire Naturalists' Union. The discovery, which was determined by Hackel, was reported in at least four journals at the time, and was mentioned in many more articles and notes at later dates. Even so, the details which should accompany such a discovery were not noted as fully as might be expected and, furthermore, certain variations are present in the different accounts at hand. The details which follow are compiled from various accounts published in certain journals, and from manuscript notes by Rev. E. A. Woodruffe-Peacock and W. W. Mason, which were kindly communicated to me by Miss E. J. Gibbons.

The record has usually been attributed to Peacock, but it seems clear that Miss S. C. Stow was, in fact, the original discoverer, and that she pointed it out to companions with her on the excursion. The discovery was actually reported by Peacock (1903) and by Bennett (1903), neither of whom gave an individual recorder, but the former author, in manuscript notes at Cambridge and in a manuscript copy of the 'Botany' chapter for the projected 'Victoria History of Lincolnshire', attributes the record to Stow. Peacock (1909) later cites 'L.N.U., 1904', the date being erroneous. Several specimens were collected on the excursion, and are present in various herbaria. The plant was discovered on a stone-heap by a wall-side on the Cornbrash (a very arid limestone) where it 'feathers-out' thinly over the Great Oolite Clay between Careby Wood, Careby and Monk's Wood, Carlby, three-quarters of a mile from the nearest house in 'the most countrified country'. More precise details of the locality are lacking. The dividing parish boundary of Careby and Carlby, two small villages about two miles apart, runs approximately half-way between the two woods, and the precise locality of the discovery, or even if the parish concerned was Careby or Carlby, is unknown. To exemplify the uncertainty here, Peacock (1903) in his original notice, mentions the locality as Careby, but in an MS note accompanying a specimen in Lees' 'Outline Flora of Lincolnshire' (1892) he cites Carlby. Furthermore, Mason's specimen in Hb. Mus. Brit. is labelled Careby, but in two MS registers he gives Carlby. The other notices also refer about equally to the two parishes. Although the plant was found with *Festuca sciuroides* (= *Vulpia bromoides*) and other native plants, it was not generally considered a native, either by Peacock (1904, etc.) or by Druce (1910). Lees (*Rep. Bot. Soc. & E.C.*, **2**, 1910), however, did not agree with this conclusion. Whatever its status, however, it has never been seen since, although it was searched for in 1904 and 1905 (Peacock's MS notes at Cambridge), and at least three times since 1950.

The second record for the plant in Britain was, it appears, never published. It is represented by two herbarium specimens, one in Hb. Kew and one in Hb. Mus. Brit. The Kew specimen was sent from Wye, Kent (v.c. 15), by F. Escombe on 9th July 1906. It apparently came up in a row of grass labelled '*Festuca eu-ovina*', which was sent from Kew as seed and grown in the garden of the Wye Agricultural College. The *Nardurus* was undoubtedly a contaminant of the Kew seed. The other specimen (Hb. Mus. Brit.) was collected in the same place by C. J. Alexander a year later, on 7th June 1907. The collector was apparently unaware of its previous discovery, and sent it as a natural weed of beds of fescues and rye-grasses under cultivation. The collector had provisionally identified it as *Festuca ovina* × *Lolium perenne*, and it remained thus labelled until Dr. A. Melderis recently discovered its true identity.

If the above record for v.c. 15 is to be discredited because of the plant's unnatural origin then it may be replaced by the third British record, collected at Littlestone-on-Sea in May 1909 by Lady Davy. The *Nardurus* was growing in sandy soil not far from a railway with such native species as *Catapodium rigidum* and *C. marinum*, and was identified by Druce and confirmed by Hackel. Druce (1910) considered that the grass was possibly native in Kent, but probably introduced in Lincolnshire. Only one specimen from Littlestone has been traced.

There appear to be just two further pre-war British records for *Nardurus*, both from a third area of Britain, namely the South-West. The first of these is from South Devon (v.c. 3), collected by G. T. Fraser and Rev. T. S. Stephenson on 22nd June 1935, near Torbryan, S.W. of Newton Abbot. Three separate patches were discovered, all on the top of a wall between a pasture and a road. This record appears to have re-instigated a good deal of interest in *Nardurus maritimus*: it was reported in several places, and eight specimens have been traced. Hubbard (1936), who identified the Devon plant, concluded that the foreign distribution of the species suggested that it was possibly native in Britain.

The last pre-war record of *Nardurus* was from a Bristol rubbish-tip, North Somerset (v.c. 6), where it was collected by J. P. M. Brenan and C. I. Sandwith in 1937. It was recorded in two places in the literature, and the first named recorder possesses a specimen.

Nardurus is recorded as being found once during the last war (in 1941 onwards), on cinders in Clifton goods yard, Derbyshire (v.c. 57), by K. M. Hollick. The record does not appear to have been published, but several herbarium specimens have been traced.

From 1949 onwards *Nardurus maritimus* has been found in a considerable number of new localities in Britain but, although these comprise ten new vice-county records, the known range of the plant in Britain has not been extended. This range is Devon and Kent to Derby and Lincolnshire.

The British records of *Nardurus* are perhaps best summarized in the following list, which includes both published and unpublished records as well as notes of herbarium specimens. The numbers in parentheses refer to the references, and additional abbreviations are K (Hb. Kew) and BM (Hb. Mus. Brit.). * denotes that the plant was found in *totally* un-natural conditions.

S. DEVON, *v.c. 3*. *On wall-top near Torbryan, S.W. of Newton Abbot, 22 and 30 June 1935, *G. T. Fraser & T. S. Stephenson* (11, 19, 22, K (2)); Ibid., May 1936, *T. S. Stephenson*, comm. *J. Chapple* (12, K, BM, HB. LOUSLEY, HB. WALLACE); Origin ibid., cult. at Kew from seed, leg. *C. E. Hubbard*, 1937 (HB. CANTAB., HB. OXON. (3)), June 1938 (K).

N. SOMERSET, *v.c. 6*. *On Bristol rubbish tip at Ashton Gate Iron Works, 30 May 1937, *J. P. M. Brenan & C. I. Sandwith* (13, 22, 31, HB. BRENAN).

S. HANTS. *v.c. 11*. With typical chalkland flora by old bomb craters, Pitt Down, nr. Winchester, Oct. 1956, *W. M. M. Baron* (pers. comm.); Ibid., June 1957 (HB. BARON, HB. OXON.); Ibid., 1960 (*Baron*, pers. comm.).

N. HANTS., *v.c. 12*. (1) *On chalk spoil heaps near Micheldever rly. stn., 20 June 1955, *W. E. Warren & E. C. Wallace* (4, HB. WALLACE); The Scrubs, Micheldever, 24 June 1956, *J. E. Lousley & E. C. Wallace* (K, HB. CANTAB., HB. LOUSLEY, HB. WALLACE, HB. LEICESTER, HB. STACE); not seen recently (*Baron*, pers. comm.).

(2) Nr. Abbotstone Down, May 1957, *E. Milne-Redhead* (K, fide *M.-Redhead*).

E. KENT, *v.c. 15*. (1) *In row of *Festuca ovina* sent from Kew, Wye Agricultural College, 9 July 1906, *F. Escombe* (K); Weed in rows of fescues and ryes, Wye A. C., 7 June 1907, *C. J. Alexander* (BM).

(2) On sandy soil not far from rly., Littlestone-on-Sea, May 1909, *Lady Davy* (8, 11, 16, 19, HB. OXON.).

(3) In old parts of the chalk-pit at Hollingbourne, on bare chalk patches, 24 May 1959, *J. F. & P. C. Hall* (6, 18, BM, HB. HALL); Ibid., June 1960, *F. Rose* (HB. ROSE); Ibid., May 1961, *Miss M. E. Milward & Mrs. B. H. S. Russell* (comm. *P. C. Hall*).

W. KENT, *v.c. 16*. (1) Bare chalk at foot of downs, Trottiscliffe, 23 May 1959, *J. F. & P. C. Hall* (6, 18, BM, HB. HALL); Ibid., 31 May 1959, *J. E. Lousley, J. F. & P. C. Hall* (K, HB. LOUSLEY); Downs above Wrotham Water, June 1960, *F. Rose* (HB. ROSE); Ibid., 27 May 1961, *C. A. Stace, J. F. & P. C. Hall* (HB. STACE).

(2) Bare chalk on chalk escarpment, Halling Warren, 23 May 1959, *J. F. & P. C. Hall* (6, 18, HB. HALL); Ibid., 31 May 1959, *J. E. Lousley, J. F. & P. C. Hall* (K, HB. LOUSLEY); Ibid., 27 May 1961, *C. A. Stace, J. F. & P. C. Hall* (HB. STACE).

(3) *On topsoil by the side of Halling Quarry, 14 May 1961, *J. F. & P. C. Hall*.

(†) *In fair quantity, with *Epilobium*, in a recent woodland clearing above Upper Halling, 24 May 1961, *J. P. M. & R. A. F. Brenan* (HB. BRENAN, K).

SURREY, *v.c. 17*. (1) Top edge of fallow field on downs at Chipstead, 7 June 1960, *J. F. & P. C. Hall* (BM. HB. HALL); Ibid., 15 June 1960, *J. E. Lousley* (HB. LOUSLEY); Ibid., 29 June 1960, *U. K. Duncan* (comm. *F. H. Perring*); Ibid., August 1960, *E. C. Wallace* (pers. comm.); Ibid., 4 June 1961, *C. A. Stace, et al.* (HB. STACE).

MIDDLESEX, *v.c. 21*. *Plentiful and well established on rly. tracks between Denham and Uxbridge, 9 June 1951, *D. H. Kent* (3, 20, HB. KENT); Ibid., 26 May 1960, *Lady Anne Brewis* (HB. LOUSLEY).

BERKS., *v.c. 22*. Craters, paths and burrow edges on chalk grassland at Fairmile, nr. Streatley, 18 June 1954, *W. M. M. Baron & R. F. O. Kemp* (HB. OXON., HB. BARON); Ibid., 2 June 1955, *W. M. M. Baron* (BM, K); On barish places among short chalk turf, between the Fair Mile and Celtic Field, nr. Streatley, 9 June 1956, *R. A. Graham & E. F. Warburg* (K); Cholsey Downs, nr. Streatley, 20 June 1956, *D. McClintock* (HB. LOUSLEY).

OXFORD, *v.c. 23*. (1) On bare chalk in chalk grassland, Bald Hill Rifle Range, nr. Watlington, 10 Nov. 1955, *W. M. M. Baron* (HB. BARON); Ibid., 27 Nov. 1955, *R. S. R. Fitter* (HB. LOUSLEY); In disturbed ground over a considerable area, valley between Shirburn Hill and Bald Hill, nr. Lewknor, c. 1957, *E. F. Warburg* (HB. CANTAB., HB. OXON.); Bald Hill, 8 June 1958, *J. E. Lousley* (HB. LOUSLEY).

(2) Near Christmas Common, 1960, *Mrs. Paul* (29).

BUCKS., *v.c. 24*. On anthills and by paths, Dancer's End Nature Reserve, nr. Tring, 3 June 1957, *E. F. Warburg* (HB. OXON.); Ibid., 27 June 1957, *J. E. Dandy* (BM).

BEDFORD, *v.c. 30*. *? Waste ground, Goldington, nr. Bedford, 10 June 1957, *B. E. Juniper* (HB. OXON.).

S. LINCOLN, *v.c. 53*. *(First Record) On arid limestone between Careby Wood, Careby and Monk's Wood, Carlby, 9 June 1903, *S. C. Stow, E. A. W. -Peacock, W. W. Mason, et al.* (2, 11, 16, 19, 21, 26, 27, 28): Lincs., *Peacock* (BM); Careby, *Mason* (BM); Carlby, *Peacock* (BM, HB. OXON., spec. in Lees' Flora at Cambridge); Carlby, *Mason* (HB. OXON.); Careby, *Stow* (HB. STOW at Grantham Museum).

RUTLAND, *v.c. 55*. (1) *On Lincs. limestone floor of Bloody Oaks Quarry, Roundstone Hill, in recent workings only, 12 June 1949, *E. K. Horwood* (K, HB. CANTAB., HB. LEICESTER); Ibid., 7 July 1956, *J. E. Lousley* (K, HB. LOUSLEY); Ibid., 9 May 1960, *J. H. Chandler* (HB. CHANDLER).

(2) *? On oolitic floor of quarry, Clipsham Quarry, 3 June 1956, *E. K. Horwood* (7, HB. LEICESTER).

DERBY, *v.c. 57*. *On cinders of rly. track, well established, Clifton Goods Yard, June 1941, *K. M. Hollick* (HB. HOLLICK); Ibid.,

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†This is apparently the same locality as 3.

1947, *K. M. Hollick* (K); Ibid., 10 June 1948, *K. M. Hollick* (Hb. Lousley); Ibid., 10 June 1951, *K. M. Hollick* (K); Ibid., 20 May 1961, *K. M. Hollick* (BM, Hb. Stace).

3. Ecology and Status

From an examination of the above mentioned records it can be seen that *Nardurus* has a fairly well defined ecological preference. It has mostly been found on barish waste or rubbly places on dry or very dry chalk or limestone. These conditions are typically exemplified by the habitats at Hollingbourne, Chipstead, Winchester, Watlington, Streatley and elsewhere. Many other plants are typical of these localities, and often accompany *Nardurus*. A simple vegetation analysis was carried out in three localities, and similar data were very kindly supplied on two further localities by W. M. M. Baron. This information is summarized in Table 1.

TABLE 1

	I	II	III	IV	V
Bare Ground	15%	25%	18%	<5%	10%
NARDURUS MARITIMUS	2	1-2	2	1	2
Constancy 5/5					
POTENTILLA REPTANS	+	R	+	+	R
FRAGARIA VESCA	+	+	R	2	+
PRUNELLA VULGARIS	2	+	R	+	+
CATAPODIUM RIGIDUM	1	1-2	1	R	R
CAMPTOTHECIUM LUTESCENS	R-+	R	1	R	+
Constancy 4/5					
RANUNCULUS REPENS	+	+	0	R	R
LINUM CATHARTICUM	R	0	1	+	+
POTERIUM SANGUISORBA	R	0	1	+	2
VERONICA CHAMAEDRYS	R	0	R	R	R
TARAXACUM OFFICINALE	R	+	+	0	R
T. LAEVIGATUM	+	R	1	0	+
Constancy 3/5					
VIOLA HIRTA	0	0	R	1	+
HYPERICUM PERFORATUM	0	0	R	+	R
CERASTIUM HOLOSTEOIDES	0	0	+	+	R
MEDICAGO LUPULINA	0	0	1	+	R
ORIGANUM VULGARE	0	0	1	+	+
THYMUS DRUCEI	0	1-2	2	0	+
FESTUCA OVINA	R	1	0	0	R
PSEUDOSCLEROPODIUM PURUM	R	0	+	R	0
Constancy 2/5					
IBERIS AMARA	R	+-1	0	0	0
HELIANTHEMUM CHAMAECISTUS	0	R	0	0	2
GERANIUM COLUMBINUM	R	0	0	0	+
LOTUS CORNICULATUS	0	0	2	1-2	0
RUBUS FRUTICOSUS	0	0	0	2	1
SEDUM ACRE	2	+	0	0	0
CENTAURIUM ERYTHRAEA	R	0	+	0	0
GENTIANELLA AMARELLA	0	R	R	0	0
VERONICA ARVENSIS	0	0	+	0	R

	I 15%	II 25%	III 18%	IV <5%	V 10%
EUPHRASIA NEMOROSA	0	0	1	0	+
PLANTAGO LANCEOLATA	R	0	1	0	0
ASPERULA CYNANCHICA	R	R	0	0	0
GALIUM MOLLUGO	R	0	R	0	0
BELLIS PERENNIS	R	0	1	0	0
CIRSIUM ARVENSE	R	R	0	0	0
LEONTODON HISPIDUS	0	R	1	0	0
HIERACIUM PILOSELLA	0	R	1	0	0
CREPIS CAPILLARIS	R	R	0	0	0
FESTUCA RUBRA	0	+	0	+	0
LOLIUM PERENNE	0	0	+	0	R
VULPIA BROMOIDES	0	0	0	+	+
BRACHYPODIUM SYLVATICUM	0	0	2	2	0
AGROSTIS STOLONIFERA	2	R	0	0	0
BARBULA UNGUICULATA	R	+	0	0	0
BRYUM sp.	R	R	0	0	0
EURHYNCHIUM SWARTZII	0	0	0	R	R
Constancy 1/5					
POLYGALA VULGARIS	0	0	1	0	0
P. CALCAREA	0	0	R	0	0
ERASTIUM ARVENSE	R	0	0	0	0
ERASTIUM sp.	0	R	0	0	0
RENARIA SERPYLLIFOLIA	0	0	0	0	R
HENOPODIUM sp.	+	0	0	0	0
RIFOLIUM REPENS	0	0	R	0	0
. DUBIUM	0	0	1	0	0
PHANES MICROCARPA	0	0	0	0	R
RATAEGUS MONOGYNA	0	0	0	R	0
HELYCRANIA SANGUINEA	0	0	1	0	0
ASTINACA SATIVA	R	0	0	0	0
UMEX ACETOSELLA	0	0	0	0	R
UMEX sp.	0	R	0	0	0
LACKSTONIA PERFOLIATA	0	0	R	0	0
ENTIANELLA GERMANICA	R	0	0	0	0
UPHRASIA PSEUDOKERNERI	0	0	R	0	0
HYMUS PULEGIOIDES	0	0	0	0	R
CINOS ARVENSIS	R	0	0	0	0
LECHOMA HEDERACEA	0	0	0	R	0
UCRIUM BOTRYS	0	0	0	0	R
ALIUM VERUM	0	R	0	0	0
IBURNUM LANTANA	0	0	0	R	0
NECIO JACOBAEA	0	0	0	0	R
ULA CONYZA	0	0	0	R	0
ARLINA VULGARIS	0	0	0	R	0
RSIUM ACAULON	R	0	0	0	0
YPOCHAERIS RADICATA	0	0	0	0	R
REX FLACCA	0	+	0	0	0
A ANNUA	0	0	R	0	0
ACTYLIS GLOMERATA	0	0	R	0	0
OMUS MOLLIS	0	0	R	0	0
THOMINII	0	0	R	0	0
ISETUM FLAVESCENS	0	0	0	1	0
OLCUS LANATUS	0	R	0	0	0
ROSTIS TENUIS	0	0	2	0	0
ILEUM PRATENSE	0	R	0	0	0
SSIDENS CRISTATUS	0	0	0	0	+
OINA ALOIDES	0	0	0	0	R
TTIA DAVALLIANA	R	0	0	0	0
YUM BICOLOR	R	0	0	0	0

	I	II	III	IV	V
	15%	25%	18%	<5%	10
THUIDIUM HYSTRICOSUM	0	0	R	0	0
ACROCLADIUM CUSPIDATUM	R	0	0	0	0
Total No. of Species	36	30	43	28	36

TABLE 1—ASSOCIATED SPECIES

The relative abundance of the species associated with *Nardurus* is given for t five following localities:—

I—Watlington (Baron & Kemp, 1955) Average of four quadrats each of 1 sq. r
II—Fairmile (Baron & Kemp, 1955) Four quadrats
III—Trottiscliffe (Hall & Stace, 1961) Two quadrats
IV—Halling Warren (Hall & Stace, 1961) One quadrat
V—Chipstead (Stace *et al.*, 1961) One quadrat

In each case sufficient quadrats were estimated to give a figure embracing a the main types of microhabitat which supported *Nardurus*. In the table t associates are given in order of constancy. The percentage cover of each speci was transferred to the following scale:

2—Frequent, 5-25% cover.
1—Occasional, 1-5% cover.
+—Very scattered, under 1% cover.
R—Very rare.
0—Absent.

On the Continent *Nardurus* usually occurs in very similar situations—dry barish soils often on calcareous substrata (Masclef, 1886; Vicq, 1883; Süssenguth, 1935). It is also found on sand-dunes on the coast of Pas de Calais, opposite Kent (Masclef, 1886), and Good (1928) cites *Nardurus* as being one of the plants of the Pas de Calais not found in Kent, although one record for Kent had already appeared in print. It is very likely, in fact, that the Littlestone-on-Sea record (Davy, 1909) also referred to a sand-dune area.

Thus, although these barish calcareous soils may be argued as not being 'natural' habitats anywhere in south England, it seems that *Nardurus* in Britain occupies the typical Continental habitats. It is quite possible that *Nardurus* arrived naturally in Britain at a relatively late date, after the North Downs had been cleared and barish places had been established (by landslips, grazing animals and early man, for example). Any dunes present on the East Kent coast might have provided a primary foothold for this 'invasion'. It is perhaps significant that of the twenty-two recorded localities for *Nardurus,* six belong to Kent.

By no means always does *Nardurus* exist in these typical habitats, however. The only record for v.c. 6 is from a rubbish-dump, for v.c. 3 a wall-top, and for v.c. 21 and 57 railway tracks. In these localities *Nardurus* is certainly alien, although it has survived in v.c. 57 for about twenty years. In addition it is possible that the first British record was of alien origin, since it was found only on a heap of stones, and for a single season. If all these undoubtedly alien records are excluded, then the range of *Nardurus* in Britain becomes much smaller—from Hampshire and Kent to Rutland (and S. Lincolnshire?). Even in this restricted area *Nardurus* often occurs in unnatural, alien conditions.

It is not surprising that *Nardurus* should be found in many localities as a chance introduction, as the records from Wye show that the grass so increased from one year to the next that it appeared to be a natural garden weed. Mr. D. McClintock informs me that the plant now infests his rockery, the seed originating from Streatley. The grains are very small and light and could easily be a contaminant of many products, such as corn grain. This is the likely origin of the Devon record, where *Nardurus* was found on a wall on either side of a gate leading from a road to a cultivated field! Other annual grasses, such as *Catapodium rigidum* and *Vulpia bromoides,* with which it often occurs, show the same features.

In considering the status of this grass it is obvious that only the more restricted area of British distribution referred to above should be taken into account. Even so it might be argued that *Nardurus* is probably an introduced species, since it is found only in semi- or un-natural habitats. It is quite clear from an examination of several localities (both first-hand and from communicated accounts) that *Nardurus* cannot compete very successfully in mature chalk grassland with such species as *Festuca rubra, F. ovina* and the more robust calcicolous species. Where all types of habitat exist, *Nardurus* is usualy confined to the barer rubbly areas of chalk or limestone. However, this argument would seem of little value since exactly the same is true of many other undoubted natives.

For further assessment of the status the general distribution as shown in Fig. 2, must be considered. *Nardurus maritimus* occurs commonly in the Mediterranean area, both in Europe and Africa, extending eastwards to Asia Minor and Syria (at least), and westwards to Spain and Portugal. Its extension northwards is much greater in the west than in the east. In Russia, for example, it is only found in the Crimea, whilst on the Atlantic coast it extends to Belgium (and Britain). In north France and Belgium, however, it becomes rather sparse, although there are ten records from the French Departments of Somme and Pas de Calais (Vicq, 1883; Masclef, 1886) prior to 1886.

Druce (1910) concluded that *Nardurus* was very likely to be a native, at least in Kent, and Hubbard (1936), assessing the evidence after the Devon record had been added, came to a rather similar conclusion: namely that, although the grass could be introduced with grain, it was very possibly a native of Britain. Hubbard does not, however, include *Nardurus* in his recent excellent monograph of British grasses (*Grasses,* 1955). Dandy (1958) also included *Nardurus* as a native, but this is not the opinion of all modern workers.

Although *Nardurus* is often considered part of the Mediterranean Element, this does not appear to the author to be so. It

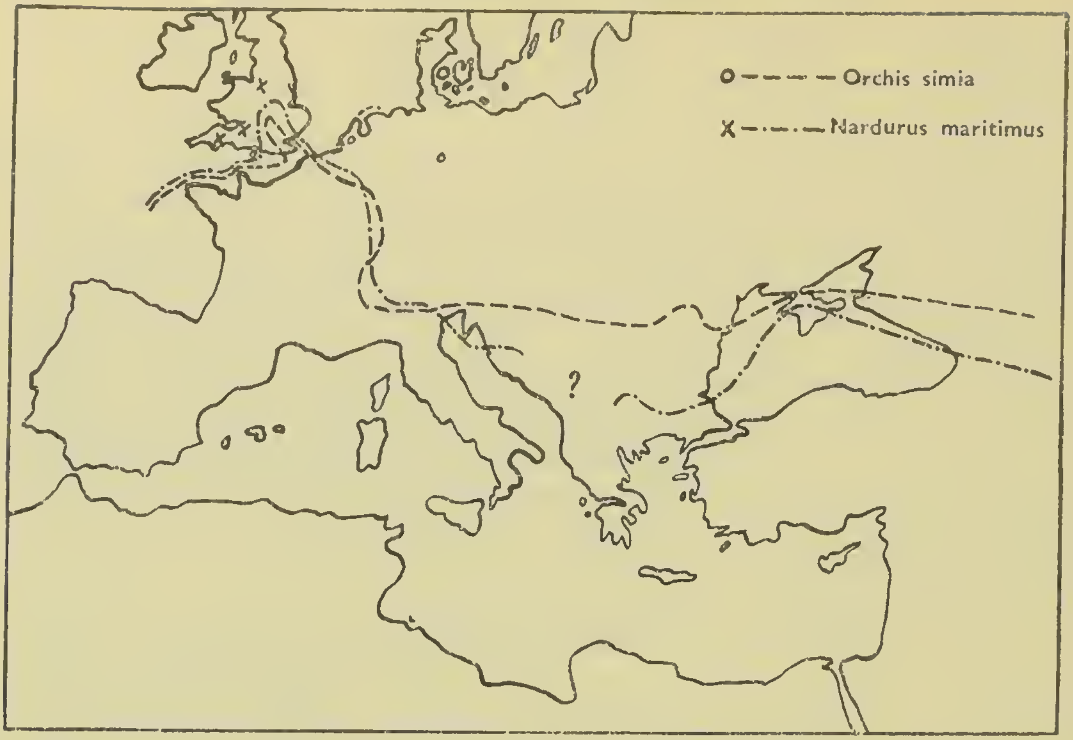

Fig. 2.—European Northern Limits of *Nardurus maritimus* and *Orchis simia*.

O—Outlying Stations (Holland and E. Germany) of *O. simia*.
X—Outlying (casual) Stations (England) of *N. maritimus*.

appears that it falls closer to one of those members of the Continental Southern Element (cf. Matthews, 1955) which are more restricted in range, showing a connection with the Oceanic Southern Element by extending much further north in the west than in the east, and being almost sub-Mediterranean in nature. In this element plants of dry sandy or calcareous soils predominate, a feature also shown by *Nardurus*. The distribution in Britain of such species is, however, quite different from that of Mediterranean or Oceanic Southern species, which are commoner in or restricted to the South-West. Continental Southern species, as shown by *Nardurus*, are commoner in or confined to south-east Britain (Matthews, 1955).

It thus appears that *Nardurus* has a British and European distribution which might be expected of a restricted example of the Continental Southern Element. A parallel to *Nardurus* was searched for, and was found in *Orchis simia*, although there are doubtless other examples. *Orchis simia* has an extremely similar European distribution to *Nardurus maritimus*, as shown in Fig. 2. In Britain it also has a similar range, although it is much more local, being confined to v.c. 15, 16, 22 (extinct) and 23. It is also a plant of chalk hills. The most serious disagreement in the two areas of distribution is in the west Balkans, especially in Jugoslavia. Here the floras do not give an adequate picture of the distribution of *Nardurus*, and the northern limit of its range is thus not certain. It certainly does not extend as far north as *Orchis simia,* however. In western Asia, however, both plants extend north to the Crimea and the Caucasus, and in western Europe the similarity in distribution is quite remarkable.

Since *Nardurus* has a British and European distribution closely similar to that of an undoubted native British plant, it seems legitimate to presume that *Nardurus* is most probably also native in Britain, although absolutely conclusive evidence is, and probably always will be, lacking. It is often concluded that some of the very rare orchids and broomrapes of the south-east chalk downs (e.g. *Ophrys fuciflora*), which are mostly also members of the Continental Southern Element, invaded Britain relatively recently—after the formation of the Channel and after parts of the North Downs were cleared (Rose, 1957), although there are some challengers of this view. It is possible that *Nardurus* is a further example of this group of plants, although it has extended further into Britain.

It is quite impossible, of course, to say whether *Nardurus* has been overlooked in the past, or whether it is now increasing. It is perhaps relevant here that the known range of the plant in Britain has not increased since 1941. It is possible that many of the 'casual' records for Britain, e.g. Clifton and Uxbridge, do not represent independent origins, but have become dispersed from areas where *Nardurus* may be native.

Nardurus may be expected to be recorded from several new vice-counties in the near future, and in this connection the most conspicuous omissions at the present are v.c. 10, 13, 14, 18, 19, 20, 29, 31 and 32.

The circumstances surrounding *Nardurus maritimus* in Britain have a quite unusual parallel in *Tortella inflexa* (Bruch) Broth., a moss recently (1951→) discovered to be locally not uncommon on bare chalk in south-east England (Wallace, 1957). Its present known distribution is Kent and Dorset to Oxfordshire and Bedfordshire—almost identical with that of *Nardurus*! The continental distribution of *Tortella inflexa* strongly suggests that it belongs to the Mediterranean Element, in which case, if it is native in Britain, its distribution in this country is quite unusual (see above). It is possible, however, that it is a member of the Continental Southern Element, so far overlooked in north France as it had been in England. It should be mentioned that alien mosses are distinctly unusual phenomena in this country. This parallel between *Tortella* and *Nardurus* is not, of course, put forward as even a tentative suggestion, but merely as a possibility.

It is sincerely hoped that this paper has done something towards pointing out the situation regarding *Nardurus maritimus,* and that botanists may be prompted to search for it elsewhere in suitable parts of England.

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THE STATUS OF CUCUBALUS BACCIFER IN ENGLAND

By J. E. Lousley

In July 1960 I was told by W. D. Campbell that his brother, Eric Campbell, knew *Cucubalus baccifer* L. in several places in remote woodland near Great Hockham, West Norfolk, v.c. 28. A few days later the two brothers showed me the plant growing in abundance in a jungle of *Phragmites*, sallow, etc., in a wet ride in Knight's Fen, Hockham (National Grid Reference 52/965910). which is now afforested. They had selected this patch as one that was easy to refind, but Eric Campbell had come across the plant in several places in woodland in the district, and had known it in Knight's Fen, and at Hills and Holes in the same parish, since 1950. In 1952 W. D. Campbell sent a specimen to Kew for identification (Hb. Kew). Although all these localities are in plantations, mostly of conifers, there is no reason to suspect that the plant could have been introduced with the trees, and it is far more likely that the seeds are spread by birds from wood to wood. There is also a possibility that *Cucubalus baccifer* grew here before the wet ground was afforested.

Knight's Fen is about 5½ miles south-east of the well-known station for the species at Merton. Here it grows on a road margin on palings at the edge of a park. Hundreds of botanists must have made a pilgrimage to this spot and probably, like myself, most of them have come away with a very low assessment of the status. It seems, however, that the well-known habitat at Merton is deceptive. The species was first found at Merton by F. Robinson in 1914 and the habitat was given as a "wood" (Robinson, 1915). In September of that year he showed it to G. C. Druce, stating that he had known it for eight or nine years, but it shifted its ground from year to year. It grew in ditches and in a wood containing larch and oak. The first place found was on the border of a wood; a year or two later it covered a hedge within a quarter of a mile of the same place. In 1914 it was in two or three places in the immediate neighbourhood, growing in open wood, through and amongst brambles (Druce, 1916). "Open wood" was the description of the habitat from which Robinson collected it in 1918 and 1923, and he noted that it extended farther than he at first thought (Robinson, 1919 and 1924). Druce thought it had the appearance of being indigenous at Merton (Druce, 1916) or came by natural means, and its geographical distribution was entirely in favour of it being a British plant (Druce, 1920). Robinson thought it native after satisfying himself that none of the residents of the parish could account for its introduction (Robinson, 1922).

It is evident that the roadside locality so many of us have been visiting for so many years is misleading and by no means representative of the occurrence of *Cucubalus baccifer* in this district. It has been known since 1905, occurs sporadically through the woods of Merton and Hockham, and its habitats are consistent with distribution by birds, and germination when light conditions are suitable. In the *Flora of the British Isles* it is said to be "Introduced. Naturalized in a few places; e.g. on the Isle of Dogs, Kent (*sic*). C. and S. Europe and across Asia to Japan" (Clapham, 1952). Clearly a review of the status of this species is desirable.

Cucubalus baccifer was first recorded as a British plant by Pena and De l'Obel in their *Stirpium Adversaria Nova* which was published in London in 1570. In this work (which, incidentally, has a magnificent dedication to Queen Elizabeth) the species is given as *Cucubalus* . . . . *plinii* "E sylvosis udis Germaniae, Flandriae, & Angliae . . . ." (Pena & Lobel, 1570, p. 104). The record is repeated by De L'Obel in his *Stirpium Historia* issued in Antwerp in 1576 which includes the *Observationes,* with a good woodcut showing flowers and fruits on p. 136, and the *Adversaria*, with the account of the plant on p. 136. The woodcut leaves no doubt about the identification and it was used again, with the record, in other works under the sole name of De L'Obel, and also in Gerard's *Herball* (see below). The failure to mention a definite locality is an obvious weakness in the record and it will be recalled that John Ray, in defending De L'Obel against Jean Bauhin's strictures, criticised him for trusting too much to his memory in respect of localities, and for giving plants as natives of England in error (cf. Raven, 1942, 74). In spite of this, some 80 species have been accepted as first recorded for Britain in De L'Obel's works, and some of these are unsupported by localities (Clarke, 1900). In favour of acceptance of Pena and De L'Obel's record are the facts that they couple England with Germany and Flanders which are undoubtedly correct, that De L'Obel was in England the previous year, and that the species is not one easily mistaken for another.

The record claimed by Druce as the first for Britain is 80 years later. In *Comital Flora* he cites How's *Phytologia Britannica*, published in 1650, where it is given as "Alsine Baccifera major . . . . In sylvis udis . . . . the Berry bearing Chickweed". How seems to have had little experience of plants in the field, and the *Phytologia* was a compilation of records lifted verbatim from earlier publications with the addition of material he drew from his friends (Gunther, 1922; Raven, 1947). In this case his record was clearly taken from Pena and De L'Obel but his error in one figure of the page reference cited is probably responsible for this not having been noticed before.

In 1633 Thomas Johnson referred to the record of Pena and De L'Obel for England and said that the only place he had seen it growing was in the garden of a Mr. Pemble, at Marylebone

(Johnson, 1633, 615). It is evident that the species was grown by the herbalists, from De L'Obel's statement that it could be transplanted or grown from seed. John Gerard had it in his garden at Holborn in 1596-1599 (Jackson, 1876, 1, 24). William Coy's grew it at Stubbers in 1616-1617 and 1621, Tradescant grew it in 1634, and Goodyer and Parkinson knew it (Gunther, 1922, 318, 321, 334, 388). It is represented in the Dillenian and Morisonian herbaria at Oxford (Vines & Druce, 1914; Druce, 1907). There is an unlocalised specimen in the herbarium of J. Blackstone (1712-1753), and later garden specimens from Richard Pulteney (1730-1801) and in J. Dickson's *Hortus Siccus Britannicus,* 1793-1799 (all Hb. Mus. Brit.).

In 1724 Dillenius in his edition of Ray's *Synopsis* included a record of *Cucubalus baccifer* from Anglesey* communicated by D. Richardson (Dillenius, 1724, p. 267). This was repeated in all British floras for over a century, until J. E. Smith produced evidence that Foulkes, who gave the record to Richardson, had only received an account of the plant from an unnamed third-party (Smith, 1824, p. 290). It can safely be dismissed as a record of the most unsatisfactory kind.

But the species was soon included again in our floras, and this time on solid grounds. It was found on the banks of a ditch in the Isle of Dogs, Middlesex, v.c. 21 (not Kent as quoted above) by G. Luxford in June, 1837. In reporting his find to a meeting of the Linnean Society on November 21, 1837, he said "If not truly indigenous it is at least perfectly naturalised" (Luxford, 1838). Over the next 16 years the plant was seen here by many botanists and numerous specimens are still in existence. In 1852 it was still plentiful (Westcombe, 1852), and there are specimens collected by Syme in that year, and he is said to have collected it in 1853 (Trimen & Dyer, 1869). Shortly afterwards, the habitat was destroyed by the construction of docks and a railway. Syme is on record as saying that the plant was "almost certainly introduced" in the Isle of Dogs locality (Syme, 1864), but this was not the view of Trimen and Dyer. In their *Flora of Middlesex* they marked introduced plants with an asterisk, and there is no asterisk against the entry for *Cucubalus baccifer*; also, after quoting the opinions of other botanists they are at pains to point out that in neighbouring countries the species grows "in localities quite similar to ours." Those who regarded the plant as introduced made no attempt to suggest evidence for their view, and from what we know of the condition of the Isle of Dogs in 1837 it is very difficult to think of any convincing way in which the species could have been brought to this place by human agency.

In the same year as Luxford discovered *Cucubalus baccifer* in the Isle of Dogs the plant was reported from near Edinburgh (Macreight, 1837). The record was expressed in vague terms and is almost certainly an error (see Druce, 1919, p. 278).

Cucubalus baccifer was reported as found among low shrubs on a cliff overhanging the sea at Woody Bay, N. Devon, v.c. 4, by H. E. Fox in 1920, and Druce commented "Its occurrence here has to be accounted for. Can it have come with shrubs, or is it native?" (Druce, 1922). His question was never answered, and I have traced no specimen collected at the time though it was twice distributed from plants grown from seed said to have been collected then (Fox, 1922 and 1923). Some of these specimens have labels stating that the plant was gathered on "waste" ground near the sea, on others it was given as "rocky" ground. It seems that the plants found at Woody Bay were much withered, and it was for this reason that Druce and Fox sowed seeds instead of preserving the specimen (Martin & Fraser, 1939, 145). Although searched for many times during the last 40 years the plant has not been found again at Woody Bay. It is not a place where one would expect a curious but unattractive species to be introduced but, on the other hand, several unusual aliens are known to be well established in wild places at Trentishoe which is only two miles away.

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*See p. 268.

There is also a record from North Essex, v.c. 19, which may be significant. In 1842 H. O. Stephens wrote "In the margin of my copy of Ray's *Synopsis,* against *Cucubalus plinii* (*C. baccifer*) a former possessor of the book has written as a habitat Springfield, Essex.' From the colour of the ink and style of writing it is evident this entry was made soon after the Dillenian edition of the *Synopsis* appeared" (Stephens, 1842). Springfield is on the outskirts of Chelmsford and includes the banks of the river Chelmer and a wet area with numerous small ponds. It may be that the former owner of the book misidentified *Myosoton aquaticum,* or some other species, but on the other hand the parish includes habitats where *Cucubalus baccifer* might well have grown. The locality is between the known wet localities for the species in the Isle of Dogs and West Norfolk. It is one that De L'Obel, who said that the plant grew wild, might have reached even with the poor communications of his day (he might also have reached the Isle of Dogs), and it is only about 16 miles from Coy's garden at Stubbers. These possibilities should be borne in mind but nevertheless the record can only be regarded as unreliable. Finally, there is an obscure record from Pulverbatch, Shropshire in 1904 (Lloyd & Rutter, 1957).

At this point we might usefully turn to the distribution of *Cucubalus baccifer* in neighbouring countries. It occurs in hedges, woods and wet places almost throughout France, but the localities are scattered (Rouy & Foucaud, 1896). It thins out towards the Channel coast. In Belgium there are four very old records from the District Picardo-Brabançon, and one for 1913 from a railway side in District Campinien. Since it has not been seen for so long its status as a native is regarded as doubtful (Lawalrée, 1954, 471). In Holland the species reaches its northern limit in Europe. It is rare, but there are at least eight localities which are mainly along the Yssel, and from Nijmegen nearly to Deventer. The habitat is given as moist places between bushes and hedges on riverbanks (Heukels, 1933, p. 321). In Germany it is widespread but absent from the northwestern lowlands; its distribution falls mainly along the alluvial soils by rivers (Hegi, 1912, p. 308). Oberdorfer gives a useful account of the habitats in southwest Germany. Here it occurs in light (i.e. cleared) wet woodland, and especially in woods in which Silver Willow is dominant which are periodically flooded, on alluvial soils rich in nutrients and humus and containing lime. It is characteristic, in the terms of plant-sociology, of *Salicetum albae,* the *Populetalia* order with the *Convolvulion* (i.e., *Calystegia sepium*) association. It is nitrogen- and summerwarmth-loving. (Oberdorfer, 1949, p. 142). In Europe the habitats include wet meadows, damp thickets, hedges, fences, dune slacks and roadsides, but its natural, characteristic habitat towards the north of its range is as described by Oberdorfer.

It has already been pointed out by Kupffer that the northern limits of *Cucubalus baccifer* are between the August isotherms for 16° and 17° C., and this is related to the need for warmth to ripen the fruits (Hegi, 1912). So far as north and west Europe are concerned there is also a surprisingly close correlation with the 64° F. (= 17·7° C.) isotherm for the July actual surface temperature. This excludes the Channel coast of France, and Denmark, but includes Belgium and Holland. There is a detached area included within this isotherm inland round London. Thus the Isle of Dogs locality fulfilled the requirement for summer-warmth suggested by the northern limit for the species in Europe. That this is so is confirmed by experience in my London garden where for the last 25 years the fruits of *Cucubalus baccifer* have turned black each year, and in every case where they have been passed on to friends they have germinated freely. Summer temperatures in the Norfolk locality, which is well away from moderating sea influence, do not differ significantly.

The humus-rich wet valley fen woodlands of Breckland have a close resemblance to the *Salicetum albae* woodlands described by Oberdorfer. *Salix alba* and *Populus nigra* are especially associated in Britain with this area. While my inspection of the afforested Knight's Fen was too brief to provide evidence of its condition before the trees were planted, it is almost certain to have been valley fen woodland. There is little available information about the vegetation of the Isle of Dogs in 1837 but we do know that the soil was alluvial, the habitat marshy, and the Thames would have brought down sufficient calcium carbonate to ensure that there was no lime deficiency. It seems that the wet Norfolk habitats and the Middlesex one by a river would be likely localities for *Cucubalus baccifer* as a native.

It is well known that the species is distributed by birds. W. D. Campbell took fruits from Hockham back with him to Berkshire and found that they were eaten freely by blackbirds, whitethroat, and great-tits. He suggests that the last-mentioned is the most likely to be the species concerned in their distribution. In winter this species joins with others in nomadic wanderings, while the European and western Asiatic form is an irregular though often abundant immigrant in autumn, and a winter visitor.

Cucubalus baccifer was known to the herbalists as *'Herba Cucubali'*, *'Herba Viscaginis bacciferi'*, or *'Alsines bacciferae'*, and the fruits provided an astringent. It may have been cultivated occasionally for other purposes, but the only evidence I can trace of cultivation in this country is as a curiosity or in botanical gardens. It is apparently not known to modern horticulture and there is no reason why it should be. While it could have been spread by birds from cultivated plants in this country, the chances of this happening have always been small. Neither is it at all likely to be introduced accidentally by human agency. No imports are likely to come from the habitats where it grows abroad—unless, perhaps, rooted sallows or poplars have been imported at some time. The seeds are most unlikely to find their way into foodstuffs for human or animal use, or to be attached to skins or brought in in any of the other usual ways.

Reviewing the evidence, it is difficult to find justification for treating this species as "introduced" and "naturalised" contrary to the opinions expressed by various earlier botanists. It was reported as wild in England in 1570, the Middlesex and Norfolk habitats are similar to those abroad, they meet the summer temperature requirements suggested by the northern limit on the mainland of Europe, and no reasonable suggestion has yet been made about how the plant was introduced other than by birds. The Essex record is very unreliable but if substantiated it would fall within the area where the plant is native. The Devon and Shropshire records are puzzling and do not fall into the pattern set by the ecology and known distribution. *Cucubalus baccifer* is less conspicuous in the field than one would expect for such a large plant with large black fruits, and it may yet be found to be more widespread in East Anglia than the present records suggest.

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ADDENDUM

The careless repetition of early records which was such a feature of the compilations of the 18th and 19th centuries led to an amusing error in the case of *Cucubalus baccifer*. The record of Richardson's from Anglesey referred to on p. 264 read "Habitus in Sepibus in insula Mona". In Stephen Robson's *The British Flora* (1777) this is translated as "In hedges in the Isle of Man". —J. E. L.

VARIATION IN POPULATIONS OF BELLIS PERENNIS L.

By Roger Hull
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Introduction

Daisies (*Bellis perennis*) vary much in morphological characters, particularly in the capitulum. Although the daisy is one of our most common plants, botanical literature contains surprisingly few comments on this variability. Most floras say that the bracts, disc-florets and ray-florets are numerous. Clapham (1952) delimits the size of the capitulum as 16 to 25 mm. and Horwood (1914) writes: ". . . . I have found plants with flowers with a very narrow diameter, less than a threepenny piece, whereas they are frequently as large as a sixpence". Sowerby (1866) says that the number of both the ligulate and tubular flowers varies from twenty to fifty but Step (1938) says that daisies have about 250 florets.

Bellis perennis has not been sub-divided in any English flora but has in several European floras. Rouy (1902) describes two sub-species and four varieties, based mainly on the size of the capitulum, which have very restricted distributions.

This paper describes a study of daisies collected in England and Scotland in 1959. The number of ray-florets, disc-florets and bracts in the capitula was determined on plants growing in their natural environment and also when transplanted into an experimental environment.

Materials and Method

Daisies were collected from the following places:—

1. A lawn in the Botanic Garden, Cambridge.
2. A meadow in Coe Fen, Cambridge.
3. Chalk grassland, Chilterns.
4. Coastal sand-dunes, Holme, Norfolk.
5. Valley pasture, Braemar, Aberdeenshire.
6. Mountain pasture, Braemar, Aberdeenshire.
7. Derelict lawns, Braemar, Aberdeenshire.

Clones (plants with organic connections) with flowers were dug up and taken to the laboratory. The bracts and ray-florets were counted as they were removed from the capitulum with tweezers. The disc-florets were cut off the receptacle with a scalpel and were counted with a camel-hair brush.

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A sample of twenty-five clones (32 capitula) from the Botanic Garden had an average of 38·3 ray-florets and 83·8 disc-florets which did not differ significantly from the average of 38·6 ray-florets and 82·3 disc-florets for the 76 flowers of 50 clones which were open on the site on one day. For future observations a sample of 25 clones was taken as representative of a population. In these sites (Chilterns, Holme and mountain pastures), where less than twenty-five clones occurred, every plant was examined.

A total of 26 clones from the seven sites were planted in Kettering loam in pots in the Botanic Garden experimental greenhouse. They were kept cool to control powdery mildew and were watered daily. The capitula produced, after six to thirty weeks, were examined in the same way as those from the field.

RESULTS

I. *Plants in the field*

In 295 capitula the number of bracts varied from 7 to 18; ray-florets from 18 to 59; and disc-florets from 14 to 152. Two-thirds of the capitula had 13 bracts. Those with few had large 'phyllodic' bracts and those with many had two sizes of bracts—about 13 large and the rest small.

For each site the numbers of ray and disc florets showed a normal distribution about the mean. The mean numbers of florets of plants collected from the Chilterns, Holme, valley pasture and mountain pasture were significantly less than the mean numbers of florets from the other sites. (See Table 1.)

TABLE 1

ANALYSIS OF FLOWERS OF *Bellis perennis* COLLECTED IN THE FIELD

Site	Average No. of ray-florets	Average No. of disc-florets	Average diameter of disc in mm.	
Chilterns	31·0 ± 1·1	51·0 ± 2·3	3·78	Small Flowered Plants
Holme*	39·0 ± 5·7	59·5 ± 3·9	3·50	
Valley pasture	29·3 ± 0·9	60·8 ± 1·9	4·19	
Mountain pasture	30·1 ± 1·9	50·7 ± 6·4	3·89	
Botanic garden	38·6 ± 0·7	82·3 ± 1·8	4·45	Large Flowered Plants
Coe Fen	39·0 ± 1·8	82·1 ± 4·8	4·89	
Derelict lawns	39·5 ± 0·9	84·2 ± 3·0	4·89	

*Only two plants in the population.

The number of ray-florets was directly correlated with the number of disc-florets (probability much less than 0·01%).

In three populations neither the length nor width of the leaves measured as an indication of the vigour of the plants, was correlated with the number of florets in the capitulum.

TABLE 2

A COMPARISON OF FLOWERS OF *B. perennis* AS FOUND IN THE FIELD AND WHEN GROWN IN THE GREEN-HOUSE

Site of clones	No. of flowers per clone	Average No. of ray-florets	Average No. of disc-florets	No. of flowers per clone	Average No. of ray-florets	Average No. of disc-florets	% change ray-florets	% change disc-florets
	a	b	c	d	e	f	g	h
		Plants in green-house			Plants in field			
Botanic Gardens, Cambridge	12	36·9	72·5	6	28·7	53·2	28·6	36
	10	45·4	100·9	2	40·5	77·5	12·2	30
	50	43·8	98·5	1	33·0	68·0	32·8	45
	4	54·8	171·5	1	57·0	90·0	−3·9	90
	10	44·2	104·0	2	40·0	61·5	10·5	69
Coe Fen, Cambridge	10	53·9	132·4	1	54·0	152·0	−0·2	−13
	6	48·8	104·7	1	54·0	113·0	−9·8	−8
	5	45·6	152·8	1	23·0	44·0	99·2	258
Chilterns	5	51·8	112·8	1	36·0	54·0	44·0	108
	6	49·3	124·0	1	33·0	56·0	49·0	122
	5	39·6	106·4	1	27·0	47·0	45·8	136
	15	41·4	88·7	1	28·0	51·0	47·8	74
	10	44·7	142·6	1	33·0	59·0	35·5	142
	7	48·1	113·6	1	34·0	51·0	41·2	124
Holme	2	48·0	132·0	1	31·0	65·0	55·0	102
	3	46·7	157·0	1	47·0	57·0	−0·7	180
Valley Pasture, Braemar	5	51·6	138·4	1	41·0	84·0	27·4	65
	5	40·4	108·6	3	34·7	80·3	16·5	33
	5	40·8	111·2	1	30·0	60·0	10·8	51
Mountain Pasture, Braemar	10	47·2	99·9	1	25·0	37·0	89·5	170
	6	45·7	97·3	1	22·0	14·0	108·0	512
	5	57·4	154·2	1	39·0	75·0	47·0	105
Derelict Lawn, Braemar	2	56·0	172·5	3	39·7	100·0	41·5	73
	5	51·6	164·2	1	47·0	99·0	9·9	63
	5	45·4	134·2	1	42·0	112·0	8·1	20
	2	36·5	96·5	1	26·0	39·0	40·5	148

II *Clones in the same environment*

One clone was split into four and records were kept for each plant. The lowest and highest average numbers of ray-florets were 42·6 ± 0·7 and 44·5 ± 1·0, and of disc florets were 96·6 ± 7·5 and 102·1 ± 3·4, the differences being insignificant.

The observations on the flowers produced by the twenty-six clones are summarised in Table 2 (columns a, b and c) along with counts on flowers from the same clones when collected in the field. (Table 2, columns d, e and f.) The change in number of florets has been calculated as a percentage of the original number in the field (columns g and h).

The numbers of bracts did not change significantly when the plants were grown in the green-house.

SUMMARY

When the plants are grown in the green-house the number of florets generally increases (Table 2). This increase is greatest in those plants which had the fewest florets in the field. Plants, which in the field could be separated into large- or small-flowered, (Table 1) could not be thus distinguished when grown in the green-house.

The number of florets per capitulum, and hence the size of the flower, is largely determined by the environment. No division of the species *Bellis perennis* can be made on the basis of the number of bracts, disc and ray-florets although the variation in their numbers is wide.

I thank Dr. S. M. Walters for suggesting this problem and supervising my work.

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PLANT NOTES

112/S. Reseda stricta Pers. This species has been recorded as an alien introduction on a number of occasions, first by Druce in 1907 (*Rep. Bot. Soc. & E. C.*, **2**, 212), from Wytham Mill, Berks., and later tentatively by both Riddelsdell from Canton, Cardiff, Glam., and Hilton from Newhaven, E. Sussex (*Rep. Bot. Soc. & E. C.*, **2**, 276, 360). Specimens on which the first two reports were based have been seen and found to be *R. lutea* L. The specimens have long narrow leaf-segments and could have been derived from introduced foreign seed, though similar forms seem to be not infrequent among British specimens, which, however, are usually broader-leaved. A number of varieties of this widespread species have been described, but they need re-valuation.

Druce eventually concluded, apparently, that his specimens were only varietally distinct from typical *R. lutea*, and made the new combination *R. lutea* L. var. *stricta* (Pers.) Druce (*The Flora of Oxfordshire*, ed. 2, 54 (1927)). He was doubly wrong in this because of the distinctness of true *R. stricta* and because his new combination is a later homonym of *R. lutea* L. var. *stricta* Müll.-Arg., *Mon. Fam. Resed.*, 188 (1858), in *Neue Denkschr. allg. Schweiz. Ges. Naturw.*, **16**.

R. stricta is superficially similar to narrow-leaved forms of *R. lutea* but the flowers are smaller and are pendulous on capillary pedicels. The petals are quite different in structure from those of *R. lutea* which are well illustrated in Sowerby's *English Botany*, ed. 3, t. 321 and Ross Craig's *Drawings of British Plants*, **4**, plate 1. In *R. stricta* the upper petals have about 5-7 lobes which are shorter than the claw, the lateral have about 7 lobes equalling or longer than the claw, and the lower have two long slender lobes, each with shorter lateral lobes at the base.—P. F. Yeo.

170. Oxalis L. In *Watsonia*, **4**, 51-69 (1958), I described *O. valdiviensis* Barn. as an annual. In point of fact, under garden conditions at any rate, it lives for several years and survives moderate frost. *O. latifolia* Kunth sets fertile seed in France [Rivals, *Bull. Soc. Hist. Nat. Toulouse*, **73**, 80-90 (1939) (as *O. martiana*)]. My description of *O. incarnata* (*loc. cit.*) is incomplete: the main bulb often has a white tuberised root, and bulbils are borne on the underground portion of the stem as well as above ground. Its root-system is thus precisely similar to that of *O. pes-caprae*. I am indebted to Prof. Rivals and Messrs. K. E. Bull and H. C. P. Smail for bringing these points to my notice.—D. P. Young.

207/A. **Acacia melanoxylon** R. Br., 1813, in Aiton, W., *Hort. Kew*, Ed. 2, **5**, 462; Black, J. M., 1926, *Fl. S. Australia*, **2**, 402; Adamson, R. S. & Salter, T. M., 1950, *Fl. Cape Peninsula*, 454; Munz, P. A., 1959, *A California Fl.*, 797. V.-c. 3, S. Devon; naturalised on cliffs at Blackpool Sands, Stoke Fleming, Aug. 8, 1959, J. E. LOUSLEY; March 3, 1961 (in flower), D. McCLINTOCK (Herb. Lousley).

Shrub or tree (growing to 15-20 m. in other countries), glabrous with the exception of the young shoots. Phyllodes broadly oblong-lanceolate, obtuse, oblique or slightly falcate, dull green, 7-10 cm. long, 1-2 (3) cm. broad, with 3-5 longtitudinal veins connected with numerous reticulating veins. Flower heads globular, pale yellow, up to 30 in racemes shorter than the phyllodes.

Blackwood Acacia is a native of Australia, locally plentiful in S. Africa, and an escape in California.

At Blackpool Sands this species is associated with other plants of garden origin, and was doubtless originally planted. Most of the plants are shrubs rather than trees but it is evidently spreading from seed, and Mr. McClintock collected a specimen showing the bipinnate leaf characteristic of the seedling stage. The species is hardy in S.-W. England in gardens.—J. E. LOUSLEY.

224/M. **Acaena microphylla** Hook. f. var. **inermis** (Hook. f.) Kirk, 1899, *Students' Fl. New Zeal.*, 134; *A. inermis* Hook. f., 1852, *Fl. Nov. Zel.*, **1**, 54-55. V.-c. 104, N. Ebudes; near Outcrop Mine, Inverarish, Isle of Raasay, 1960, U. K. DUNCAN, det. C. C. TOWNSEND (Herb. U. K. Duncan; Herb. J. E. Lousley).

A low, mat-forming perennial, with much branched woody stems. Leaves subglabrous, 1.5 to 4 cm. long, with 3-5 pairs of leaflets and a terminal one, the lowest pair or pairs rudimentary, the leaflets almost orbicular, up to 5 mm. across, glaucescent. Flowering branchlets 3-6 cm., erect. Heads globose, about 4 mm. in diameter on hairy scapes 2-3 cm. long. Fruiting calyx without spines. A native of the South Island of New Zealand.

A. microphylla with the fruiting heads crowded with long spines differs greatly in appearance from var. *microphylla*, but Kirk (*loc. cit.*) states that there is no character by which the variety can be separated "as armed and unarmed fruits may be found on the same plant or in the same head". The main purpose of the present note is not to draw attention to a variety of doubtful value, but to the persistence of the species in the Isle of Raasay for nearly a quarter of a century.

A. microphylla was first recorded from the island in 1937 by J. W. Heslop Harrison when he described it as "thoroughly naturalised so as to form a sward, with various *Agrostis* and *Festuca* species, on the coast between the pier and Suisnish Point; also at 600 feet up the Arish Burn". In 1951 he reported it as "Fully naturalised and forming a sward on Raasay; near the mine and at Suisnish Point". In 1960 Miss Duncan found it in grassy ground near deserted ironstone buildings near Inverarish. The present distribution in Raasay deserves further investigation.

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HARRISON, J. W. HESLOP (Edit.), 1937, The Natural History of the Isle of Raasay and of the adjacent islands of South Rona, Scalpay, Fladday and Longay, *Proc. Univ. Durham Phil. Soc.*, **10**, 275.

———, 1951, Introduced Vascular Plants in the Scottish Western Isles, *N.W. Nat.* (for 1948), **23**, 133.

J. E. LOUSLEY.

540/6 × 3. **Cirsium acaulon × palustre = C. × kirschlegeri** Sch.-Bip. (1844: *Jahresb. Pollichia*, **2**, 33); *C. palustri-acaulon* Kirschleger (1842: *Statist. Strasb.*; 1852: *Fl. d'Alsace*, **1**, 445). 9, Dorset; one plant in chalk grassland, Ashmore Down near Shaftesbury, July 1950, J. F. HOPE-SIMPSON, 23, Oxon.; amongst long grass in chalk scrub, Maidensgrove Scrubs, Stonor, 28th July 1951, D. P. YOUNG. Both parents present at each station.

Much resembles an up-drawn *C. acaulon;* stem leafy, with leaves shortly decurrent for 1-2 cm. down the stem, pubescent beneath; flowerheads 2-3. peduncled, smaller than in *C. acaulon;* limb of corolla equalling tube.

The Oxfordshire specimen I collected during a B.S.B.I. excursion, thinking at the time that it was the caulescent form of *C. acaulon*. Later, Dr. W. A. Sledge kindly examined it, and confirmed my suspicion that it was in fact the above hybrid. It has not hitherto been recorded from this county, but Dr. Sledge informs me that he has seen specimens from Somerset and elsewhere, besides the Dorset one.

The description above is based on Kirschleger's original one and that of Rouy (*Fl. de France*). The following are details of the Oxfordshire specimen: radical leaves many, all about 12 cm. long, spiny to the base; cauline leaves seven, 10 cm. decreasing to 3.5 cm. long, the middle ones decurrent up to 1 cm. along the stem forming small but long-spined wings; all thickly spined at least to the base. Stem 29 cm., shaggy with septate hairs, and with a little arachnoid pubescence as well just below the capitula. Terminal capitulum fully expanded, 3 cm. long, ca. 3 cm. wide; three buds (one very small) and below it on short branches. Flowers pale red (less purple than in *C. acaulon*), corolla tube 12 cm., limb 13 mm. long. Dr. Sledge provided the following comparative measurements:

	Corolla	*Tube*	*Limb*
C. acaulon	25-30	10-11	10-12
C. palustre	11-12	15	6-7
C. x *kirschlegeri*	20-23	5-6	13-15 mm.

The present specimen thus has unusually long flowers. Comparison with caulescent *C. acaulon* shows that the latter has a quite spineless stem and long petioled leaves spineless in the lower quarter or third.

On the same occasion I collected well-marked *C. palustre* var. *ferox* Dr., with white flowers and long stout straw-coloured spines, from nearby. The hybrid plant also has conspicuously straw-coloured spines, and it may be that var. *ferox* was one of its progenitors.—D. P. YOUNG.

For a previous note on this hybrid, with two N. Somerset (v.c. 6) records, det. by Dr. W. A. Sledge, see C. I. Sandwith, "Bristol Botany in 1942", in *Proc. Bristol Nat. Soc.*, Ser. 4, **9**, 363-364 (1943).—Ed.

674/2 × 1. **Catapodium marinum × rigidum.** 48, Merioneth; a single plant in a mixed population of *C. marinum* and *C. rigidum* on railway ballast by Aberdovey Station, 31st May 1960, P. M. Benoit, confirmed by C. E. Hubbard.

The plant, which has two culms, measuring 58mm. and 30mm. respectively, is apparently the first hybrid of this parentage to be recorded. It is more or less intermediate between the parent species in habit, and in the length of the pedicels, shape of the spikelets and degree to which they project forward from the rachis, size of the glumes, size, shape and imbrication of the florets, and prominence of the lemma nerves.

It differs most obviously from *C. marinum* in its oblong rather than ovate-lanceolate spikelets, and less imbricated, more slender and acute, florets; and from *C. rigidum* in its stouter habit, much shorter pedicels, larger glumes, and larger, stouter, more imbricated florets. It further differs from both species in having extremely slender indehiscent anthers containing imperfect pollen.

The whole plant, including the root, was collected because, being a sterile annual, it would have neither produced seed nor survived to flower another season if it had been left alone. The specimen was shown at the Society's exhibition meeting of 26th November 1960, and is now in the Kew Herbarium.—P. M. Benoit.

PLANT RECORDS

Compiled by E. C. Wallace

"Plant Records" are now arranged in the order given in the *List of British Vascular Plants.* (*L.B.V.P.*) By J. E. Dandy (1958).

Records are for the year 1960 where no date is given.

The following signs are used:—

§ before the *L.B.V.P.* number: to indicate that the paragraph contains information necessitating a correction to an annotated copy of the *Comital Flora.*

† before the *L.B.V.P.* number: to indicate that the plant is not a native species in the British Isles.

† before the record: to indicate a species which, though native in some parts of the British Isles, is not so in the locality recorded.

* before the record: to indicate a new vice-county record, not published previously to this issue of the *Proceedings.*

‡ before the record: to indicate a record additional to an annotated copy of the *Comital Flora*, but published elsewhere prior to the issue of the *Proceedings* in which it appears.

[ ] enclosing a record: to indicate doubt as to the validity of the record, either of identification or locality.

It will be useful if, in future, National Grid Co-ordinates, made as accurate as is thought advisable, are added to all records. These will not be published, but the original cards containing them will be filed, and may be made available for reference.

§1/4. Lycopodium clavatum L. *107, E. Sutherland; moorland above Rogart station, 1957, M. McC. Webster.

3/1. Isoetes lacustris L. 101, Kintyre; Loch an anamh, A. G. Kenneth, det. A. C. Jermy.

§3/2. Isoetes echinospora Durieu. *101, Kintyre; Loch an anamh, A. G. Kenneth, det. A. C. Jermy.

§4/1. Equisetum hyemale L. *100, Clyde Isles; gravel bank beside burn, Allt Cloined, Kilmory Water, Isle of Arran, 1958, G. A. M. Scott. 105, W. Ross; damp dune grassland, Little Sand, Gairloch, A. McG. Stirling. *111, Orkney; ditch by side of road through disused Naval Station, Lyness Hoy, 1960, E. R. Bullard.

4/7. Equisetum sylvaticum L. 48, Mer.; rare; in small quantity with *Dactylorchis fuchsii* and *Crepis paludosa* in a wet shady place near Drws-y-nant, 1959, Mrs. H. M. Richards (1959. *Nature in Wales*, 5, 823); Llafar valley, near Parc, B.S.B.I. Field Meeting (1960, *Nature in Wales*, **6**, 91).

§4/10. Equisetum telmateia Ehrh. *107, E. Sutherland; coal mine, Brora, 1953, R. Richter, comm. M. McC. Webster.

§5/1. Osmunda regalis L. *96, Easterness; boggy ground by stream, Glen Fieshie, 1956, R. A. Boniface.

14/1. Phyllitis scolopendrium (L.) Newm. 98, Argyll; abundant in crevices of limestone pavement, Am Biod, 360 ft., Garbh Eileach. Isle of the Sea, Mrs. J. S. and C. W. Muirhead.

§16/1. Ceterach officinarum DC. *66, Durham; near High Force Hotel, M. Bradshaw. 73, Kirkcudbr.; old walls, The Grove, Terregles, A. McG. Stirling.

19/1. Cystopteris fragilis (L.) Bernh. 17, Surrey; Lingfield, R. A. R. Clarke, conf. and comm. D. P. Young.

§21/3. Dryopteris abbreviata (DC.) Newm. *105, W. Ross; Sgurr a' Chaorachain and Ben Bhan, Applecross; An Sgurr, Kishorn, A. A. Slack and A. McG. Stirling.

21/8. Dryopteris aemula (Ait.) Kuntze. 105, W. Ross; shaded rocks by shore, Achintraid, Kishorn, A. A. Slack and A. McG. Stirling.

22/3. Polystichum lonchitis (L.) Roth. 98, Argyll; Beinnan lochain and Beinn an Fecilich, Arrochar hills, A. G. Kenneth, det. E. C. Wallace.

26/1. Pilularia globulifera L. 73, Kirkcudbr.; muddy margin of recently drained Jordieland Loch, near Kirkcudbright, A. McG. Stirling.

§†39/1. Eranthis hyemalis (L.) Salisb. *85, Fife; naturalised at Cambo, and several other places, E. P. Beattie.

46/11. Ranunculus lingua L. 95, Moray; in small quantity in bog at Lochinver, near Elgin, 1957, M. McC. Webster.

46/23. Ranunculus baudotii Godr. 101, Kintyre; marshy ground near Tayvallich, A. G. Kenneth.

§56/1. Nuphar lutea (L.) Sm. *†78, Peebles; naturalised in quantity in pond in Rachan Estate, Broughton, E. P. Beattie.

§56/2. Nuphar pumila (Timm) DC. *101, Kintyre; hill loch near Loch Arail, Knapdale, A. G. Kenneth.

†58/6. Papaver somniferum L. 80, Roxburgh, many plants in a field, Newstead, 1955: 81, Berwick; bank of burn just east of Coldingham village, several plants, 1959: 83, Edinb.; banks of Almond between Kirkliston and Newliston, 1955, E. P. Beattie.

§62/1. Chelidonium majus L. *97, Westerness; lane near Arisaig 1957; Mallaig; Morar: *105, W. Ross; Achnashellach: *107, E. Sutherland; Kildonan, M. McC. Webster.

†65/1. Corydalis solidata (L.) S.w. 85, Fife, Raith, Kirkcaldy, a few plants, E. P. Beattie.

66/2. Fumaria capreolata var. babingtonii Pugsl. 95, Moray; arable fields near Elgin; Moy House garden, Forres, M. McC. Webster, det. N. Y. Sandwith.

†72/E. Eruca sativa Mill. 85, Fife; many plants on waste ground. Guardbridge, 1955-60, E. P. Beattie.

74/2. Raphanus maritimus Sm. 98, Argyll; basalt cliffs above Ellenabeich, Isle of Seil, C. W. Muirhead.

§79/3. Lepidium heterophyllum Benth. 107, E. Sutherland; Lairg; Tressidy; Rogart; Helmsdale: *109, Caithness; Halkirk, M. McC. Webster.

§†80/2. Coronopus didymus (L.) Sm. *73, Kirkcudbr.; St. Mary's Isle, E. I. Biggar. *74, Wigtown; Port Logan, W. A. Scott, det. F. H. Perring.

§†81/1. Cardaria draba (L.) Desv. *74, Wigtown; waste ground near Harbour, Drummore, A. McG. Stirling.

§84/1. Thlapsi arvense L. *104, N. Ebudes; Isle of Soay, Skye, 1946, V. Gordon. *110, Outer Hebrides; near Tarbert, 1959, F. H. Perring.

88/4. Cochlearia scotica Druce. 96b, Nairn; salt-marsh, Carse of Delnies, 1952, J. B. Simpson, comm. M. McC. Webster.

†90/2. Bunias orientalis L. 12, N. Hants.; cultivated field ¼-mile south-west of Crondall, A. Berens. *85, Fife; Inverkeithing station, abundant, E. P. Beattie.

†93/1. Berteroa incana (L.) DC. 12, N. Hants.; railway sidings, Bordon goods station, well-established, A. Berens, det. M. Mc. Webster.

94/3. Draba incana L. 98, Argyll; rock ledges, Beinn an t'Seilich. Glen Crae area, A. G. Kenneth: 105, W. Ross; calcareous outcrops north of Glas Bheinn, Strathcarron, A. A. Slack and A. McG. Stirling.

§98/1. Barbarea vulgaris R.Br. *106, W. Ross; Munlochy, Muir of Ord and Dingwall, 1957, M. McC. Webster.

98/3. Barbarea intermedia Bor. 96b, Nairn; shingle of river near Nairn, M. McC. Webster.

99/1. Cardaminopsis petraea (L.) Hiit. 105, W. Ross; on low sandstone sea-cliff, near Reiff, Coigach, E. C. Wallace.

§102/3. Rorippa sylvestris (L.) Bess. *106, E. Ross; garden weed, Munlochy, 1957, M. McC. Webster.

§102/4. Rorippa islandica (Oeder) Borbás. *109, Caithness; weed in garden of Buckies Farm, Thurso, 1956, M. McC. Webster.

103/1. Matthiola incana (L.) R.Br. †9, Dorset; well naturalised on cliffs, Portland, B.S.B.I. Field Meeting.

105/1. Erysimum cheiranthoides L. 82, Haddington; waste ground, Dunbar, a few plants, E. P. Beattie.

§107/1. Alliaria petiolata (Bieb.) Cavara & Grande. *107, E. Sutherland; Helmsdale, 1957, M. McC. Webster.

§†108/4. Sisymbrium orientale L. *82, Haddington; Spittal, a few plants by the roadside; by Biel Burn; waste ground, West Barns, Dunbar, 1958, E. P. Beattie.

§109/1. Arabidopsis thaliana (L.) Heynh. *108, W. Sutherland; east of L. Leathad nan Aighean, 1956, A. O. Chater.

111/1. Descurainia sophia (L.) Webb ex Prantl. †96b, Nairn; open sandy places about the town of Nairn, M. McC. Webster.

§113/1. Viola odorata L. *96, Easterness; near Beauly, 1957, M. McC. Webster.

113/7. Viola lactea Sm. 9, Dorset; Hurst Heath, in a damp woodland ride, H. J. M. Bowen.

113/9. Viola palustris L. 17, Surrey; still lingering in a boggy hollow at Addington, J. F. Sherwood, comm. D. P. Young.

§115/6b. Hypericum maculatum subsp. obtusiusculum (Tourlet) Hayek. *90, Forfar; river shingle, South Esk, at Brechin, 1949, U K. Duncan, det. N. K. Robson.

§115/8. Hypericum tetrapterum Fr. *105, W. Ross; marshy slope below wood, Applecross, A. A. Slack and A. McG. Stirling.

§122/1. Elatine hexandra (Lapierre) DC. *73, Kirkcudbr.; muddy margin of recently drained Jordieland Loch, near Kirkcudbright, A. McG. Stirling.

§123/1. Silene vulgaris (Moench) Garcke. *108, W. Sutherland; roadside near Melvich, 1950, M. McC. Webster.

123/2. Silene maritima With. 47, Montg.; south-east of Llanbrynmair and ½-mile west of Pant-Glas, on steep scree-like railway bank, 1955, E. Milne-Redhead and V. S. Summerhayes.

123/2 × 1. SILENE MARITIMA × VULGARIS 48, Mer.; one large plant on a bank by the shore of Llwyngwril, growing with *S. vulgaris*; *S. maritima* on shingle nearby, P. M. BENOIT.

123/7. SILENE ACAULIS (L.) Jacq. 105, W. Ross; basic rocks (Epidiorite), An Sgurr, Kishorn, at 1,000 ft., A. A. SLACK and A. McG. STIRLING.

123/12. SILENE NOCTIFLORA L. 66, Durham; Durham, casual, Mrs. J. O. Cobham; first record for Durham for many years, J. W. Heslop-Harrison (1960, *Vasc.*, **45**, 22).

§123/14. SILENE ALBA (Mill.) E. H. L. Krause. *98, Argyll; garden weed, "Ben Alder", Ardconnel Road, Oban, 1955, P. MACPHERSON. *101, Kintyre; roadside ditch, Tayvallich-Keills road, Droineach, A. G. KENNETH, det. E. C. WALLACE.

123/14 × 13. SILENE ALBA × DIOICA 48, Mer.; several plants with the parents on waste ground by Aberdovey railway station: 52, Anglesey; one plant with *S. dioica* by the side of the Malltraeth-Newborough road, near the Forestry Offices, P. M. BENOIT.

131/5. CERASTIUM ARCTICUM Lange. 105, W. Ross; Coire na Poite, Ben Bhan, Applecross, at 2,700 ft., A. A. SLACK and A. McG. STIRLING.

§136/1. SAGINA APETELA Ard. *107, E. Sutherland; Balnacoll: *108, W. Sutherland; Tongue, M. McC. WEBSTER.

§136/3. SAGINA MARITIMA Don. *96b, Nairn; dune slacks, Nairn; Carse of Delnies: 106, E. Ross; Nigg Bay, 1957, M. McC. WEBSTER.

§136/9. SAGINA SUBULATA (S.w.) C. Presl. *107, W. Sutherland; cinders on railway line, Rogart, 1957, M. McC. WEBSTER.

§143/1. SPERGULARIA RUBRA (L.) J. & C. Presl. *†79, Selkirk; Galashiels sewage works, in some quantity, E. P. BEATTIE.

143/3. SPERGULARIA RUPICOLA Lebel ex Le Jolis. 48, Mer.; on the shore between Friog and Llwyngwril; previously recorded in Merioneth only from the walls of Harlech Castle, P. M. Benoit (1960, *Nature in Wales*, **6**, 92).

§146/1. HERNIARIA GLABRA L. *†85, Fife; a few plants on waste ground, Guardbridge, E. P. BEATTIE.

†146/4. HERNIARIA CINEREA DC. 85, Fife; a single large patch on waste ground, Guardbridge, 1958, E. P. BEATTIE.

†149/2. MONTIA PERFOLIATA (Willd.) Howell. 83, Edinb.; Mortonhall, abundant, E. P. BEATTIE.

§154/14. Chenopodium rubrum var. pseudo-botryodes H.C. Wats. ‡45, Pemb.; on cracked mud of a dried-up pond, Skomer Island, 1959, T. A.W. Davis, det. F. H. Perring (1960, *Nature in Wales*, **6**, 91). See also Buxton and Lockley, *Island of Skomer*, 139 (1950)—Ed.

§154/16. Chenopodium glaucum L. 17, Surrey; rubbish-tip, West Byfleet: *81, Berwick; near a rubbish-tip, Chirnside, M. McC. Webster.

§155/1. Beta vulgaris subs. maritima (L.) Thell. *103, Mid Ebudes; Iona, 1948, K. W. Braid (*Hb. Univ. Glasgow*): *104, N. Ebudes; Canna, 1938 (*Hb. Univ. Glasgow*), comm. A. McG. Stirling.

†159/2. Salsola pestifer A. Nels. 83, Edinb.; Leith Docks, several plants, 1958, E. P. Beattie.

§160/2. Salicornia dolichostachya Moss. *48, Mer.; mudflats, Barmouth Junction and Mochras, 1959, P. M. Benoit, det. P. W. Ball. *73, Kirkcudbr.; Sandside shore, Kirkcudbright; Skyreburn Bay, Gatehouse-of-Fleet; mouth of Southwick Burn; shore near Creetown, A. McG. Stirling, det. P. W. Ball.

160/3. Salicornia europaea L. 99, Dunbarton; Ardmore Point, Helensburgh, A. McG. Stirling, det. P. W. Ball.

§160/4. Salicornia ramosissima Woods. *48, Mer.; mudflats at Barmouth and Mochras, 1959, P. M. Benoit, det. P. W. Ball. *73, Kirkcudbr.; Dee Estuary near Bishopton; Orchardton Bay; mouth of Southwick Burn; shore near Creetown, A. McG. Stirling, det. P. W. Ball.

160/L. Salicornia lutescens P. W. Ball & Tutin. *48, Mer.; mudflats, Barmouth Junction and Mochras, 1959, P. M. Benoit, det. P. W. Ball. *73, Kirkcudbr.; mouth of Southwick Burn, A. McG. Stirling, det. P. W. Ball.

163/2. Malva sylvestris L. 96b. Nairn; sandpit 1 mile east of Nairn, a single plant: rare in Moray Firth, M. McC. Webster.

†163/6. Malva parviflora L. 75, Ayr; Barskimming Mill, Mauchline, A. McG. Stirling, det. at Kew. 85, Fife; waste ground, Guardbridge, E. P. Beattie.

†164/0. Lavatera olbia L. 22, Berks.; roadside, Appleton, H. J M. Bowen.

†166/2. Linum usitatissimum L. 82, Haddington; plentiful in a field, Archerfield, Dirleton: 83, Edinb.; Leith Docks, several plants, 1959, E. P. Beattie.

§168/1. Geranium pratense L. *†96, Easterness; railway embankment about 2 miles north of Inverness, 1957, M. McC. Webster.

§168/2. Geranium sylvaticum L. *103, Mid Ebudes; near Bunessan, Isle of Mull, 1958, E. P. Beattie and U. K. Duncan.

†168/3x4. Geranium endressi x versicolor. 63, S.-W. York.; West Chevin Road, Otley, F. Houseman, det. C. M. Rob.

§168/9. Geranium pyrenaicum Burm. f. *79, Selkirk; small quarry near Haremoss, about 3 miles south of Selkirk, E. Milne-Redhead and V. S. Summerhayes.

§168/12. Geranium rotundifolium L. 9, Dorset; Portland, several places, B.S.B.I. Field Meeting. *†85, Fife; West Links, St. Andrews, several plants, E. P. Beattie.

§168/14. Geranium pusillum L. *†79, Selkirk, plentiful at Galashiels Sewage Works, 1959, E. P. Beattie. *93, N. Aberdeen; golf-course, Fraserburgh; near Mintlaw; Rattray Head, 1957: 96b, Nairn; Nairn cemetery, M. McC. Webster.

§168/15. Geranium lucidum L. *79, Selkirk; small quarry near Haremoss, about 3 miles south of Selkirk, E. Milne-Redhead and V. S. Summerhayes. 105, W. Ross; limestone rocks near shore, Sanachan, Kishorn, A. A. Slack and A. McG. Stirling; remove? in *C.F.*—Ed.

169/4. Erodium glutinosum Dumort. 49, Caern.; near Morfa Mawr Farm. Morfa Dinlle, R. H. Roberts.

†170/4. Oxalis europaea Jord. 24, Bucks.; garden weed, Bourne End, A. F. Wood, conf. D. P. Young.

†170/7. Oxalis corymbosa DC. 24, Bucks.; garden weed, Bourne End, A. F. Wood, conf. D. P. Young.

†170/V. Oxalis valdiviensis Barnéoud. 5, S. Som.; garden weed, Minehead, 1959, A. F. Wood, det. D. P. Young.

§†171/3. Impatiens parviflora DC. ‡47, Montg.; on the Montgomeryshire bank of the Dovey at Rhiwlas, near Machynlleth, Col. Osborne Jones (1960, *Nature in Wales*, **6**, 92).

†173/2. Acer platanoides L. 84, Linlithgow; Dundas Woods, near Kirkliston: 85, Fife; Kirkcaldy, E. P. Beattie.

§179/1. Rhamnus catharticus L. *43, Radnor; near Llanstephan, 1956, H. J. M. Bowen.

§185/2. Genista anglica L. 45, Pemb.; moist heather moor, Rhos-y-llyn, Llanfyrnach, 2 plants only found, 1959, T. A. W. Davis, conf. A. E. Wade (1960, *Nature in Wales*, **6**, 20). 96b, Nairn; heath near Loch Aran, M. McC. Webster.

§190/1. Medicago falcata L. *82, Haddington; waste ground, Dunbar, several plants, 1958-1960, E. P. Beattie.

191/4. MELILOTUS INDICA (L.) All. 94, Banff; rough ground, Dufftown, 1957, M. McC. WEBSTER.

§192/17. TRIFOLIUM HYBRIDUM L. *97, Westerness; meadow near Inversanda, 1957, M. McC. WEBSTER.

§195/3. LOTUS PEDUNCULATUS Cav. (*L. uliginosus* Schkuhr). *109, Caithness; bog by the Thurso river, Halkirk; bog on top of the cliffs, Lybster, 1958, M. McC. WEBSTER. *112, Zetland; near Stornoway, 1959, B.S.B.I. FIELD MEETING, comm. U. K. DUNCAN.

§†203/1. CORONILLA VARIA L. *82, Haddington; Biel Burn, West Barns, Dunbar, abundant, 1959-1960, E. P. BEATTIE.

§206/2. VICIA TETRASPERMA (L.) Schreb. *95, Moray; garden weed, Greshop House, near Dallas; Elgin, 1957: *106, E. Ross; Balintore, M. McC. WEBSTER.

†206/7. VICIA DASYCARPA Ten. 11, S. Hants.; waste ground, Southampton, Miss D. STEVENS, det. at KEW.

206/9. VICIA OROBUS DC. 75, Ayr; rocks above the reservoir, Afton Glen, New Cumnock, A. McG. STIRLING.

206/10. VICIA SYLVATICA L. 98, Argyll; sea cliff on north side of Dun Mor, Ellenabeich, C. W. MUIRHEAD. 105, W. Ross; basic rocks (Epidiorite), An Sgurr, Kishorn, A. A. SLACK and A. McG. STIRLING.

§206/15. VICIA ANGUSTIFOLIA L. *109, Caithness; Berriedale, M. McC. WEBSTER.

§211/1. RUBUS CHAMAEMORUS L. *111, Orkney; near summit of heather moor at c. 600 ft., Muckle Eskdale Firth, E. BALFOUR and E. R. BULLARD.

†212/7. POTENTILLA RECTA L. 85, Fife; West Links, St. Andrews, 2 plants, 1958, E. P. BEATTIE. 91, Kincard.; railway embankment near Kirkside, St. Cyrus, U. K. DUNCAN, det. C. C. TOWNSEND.

212/12. POTENTILLA CRANTZII (Crantz) G. Beck ex Fritsch. 88, Mid-Perth; hills south of Loch Earn, at 1,800 ft., A. McG. STIRLING.

212/14. POTENTILLA ANGLICA Laichard. 73, Kirkcudbr.; roadside verge near Loch Sloan, M. McC. WEBSTER.

213/1. SIBBALDIA PROCUMBENS L. 98, Argyll; Binnein an Fhilleir, east summit, A. G. KENNETH.

217/1. DRYAS OCTOPETALA L. 98, Argyll; on ledges below cliff top (basic conglomerate), Sron an Eun, Garbh Eileach, Isles of the Sea, Mrs. J. S. and C. W. MUIRHEAD.

§220/3(9). Alchemilla glomerulans Buser. *98, Argyll; rock ledges, Arrochar Hills, A. G. Kenneth, det. S. M. Walters. *105, W. Ross; rare on Cambrian limestone, at 1,000 ft., near Loch an Loin, Kishorn, A. A. Slack and A. McG. Stirling.

§220/3(10). Alchemilla glabra Neygenf. ‡28, W. Norfolk; brick-pit near Swanton Novers, 1956, C. P. Petch (1958, *Trans. Norf, & Norw. Nat. Soc.*, **18** (7), 17). 98, Argyll; rocky outcrops above the garden, An Cala, Isle of Seil, C. W. Muirhead.

221/2. Aphanes microcarpa (Boiss. & Reut.) Rothm. 45, Pemb.; moorland near Mynachlog-ddu; stubble near Strumble Head, T. A. W. Davis, det. A. E. Wade.

†224/1. Acaena anserinifolia (J. R. & G. Forst.) Druce. 82, Haddington; long established near quarry on way to Gullane Point, Gullane, E. P. Beattie.

§225/1. Rosa arvensis Huds. *73, Kirkcudbr.; near Bridge of Dee, Castle Douglas; near Rusko Bridge, Castramont, Gatehouse of Fleet, A. McG. Stirling.

§225/12. Rosa sherardii Davies. ‡45, Pemb.; overgrown field hedgebank, St. Ishmaels, 1958, T. A. W. Davis, det. F. Perring, as f. *resinosoides* (1960, *Nature in Wales* **6**, 91). 98 Argyll; hedgerow on Benderloch—Barcaldine road, 1951, M. B. Gerrans, det. R. Melville, as f. *glabrata* Ley *sensu* Wolley Dod.

§†226/2. Prunus domestica L. *94, Banff; near Buckie, 1958: *109, Caithness; Berriedale, 1958, M. McC. Webster.

†226/7. Prunus laurocerasus L. 82, Haddington; Biel Woods: 83, Edinb.; Dreghorn Woods, E. P. Beattie.

†226/8. Prunus lusitanica L. 82, Haddington; Biel Woods: 83, Edinb.; Dreghorn Woods, E. P. Beattie.

§†227/2. Cotoneaster simonsii Bak. 80, Roxburgh; left bank of Tweed, 200 yards from red bridge, just outside Melrose, a single plant, 1959: *82, Haddington; Archerfield, Dirleton: *88, Mid Perth; woodland at back of Callander, several plants; wood, Loch Rosemount, Blairgowrie, E. P. Beattie.

§†227/3. Cotoneaster horizontalis Decne. *9, Dorset; Portland, B.S.B.I. Field Meeting.

§†227/4. Cotoneaster microphyllus Wall. ex Lindl. 82, Haddington; long established on wall of quarry, Gullane, E. P. Beattie.

232/4(1). Sorbus intermedia (Ehrh.) Pers. 105, W. Ross; limestone rocks near Sanachan, Kishorn, A. A. Slack and A. McG. Stirling.

232/5(1). SORBUS ARIA (L.) Crantz. 105, W. Ross; limestone rocks near Sanachan, Kishorn, A. A. SLACK and A. McG. STIRLING.

§232/5(7). SORBUS RUPICOLA (Syme) Hedl. *98, Argyll; Creag nam fitheach, A. G. KENNETH, det. E. C. WALLACE. *105, W. Ross; wooded limestone cliff near Courthill House, Kishorn; Epidiorite cliff, Bad a' Chreamha, North Strome, A. McG. STIRLING.

§235/1. SEDUM ROSEA (L.) Scop. 98, Argyll; abundant in conglomerate cliffs, Bealach an Tarabairt, Garbh Eileach, Isles of the Sea, Mrs. J. S. and C. W. MUIRHEAD. *107, E. Sutherland; ditch near Golspie, 1958: *109, Caithness; near Loch Watten, M. McC. WEBSTER.

†239/5. SAXIFRAGA SPATHULARIS × UMBROSA. 83, Edinb.; long established in a quarry, south-east end of Corstorphine Hill, and elsewhere: 84, Linlithgow; long established on railway embankment north-east of Kirkliston station: 87, W. Perth; long established on railway embankment at Callander, E. P. BEATTIE.

§239/9. SAXIFRAGA GRANULATA L. *96, Easterness; gorge of river Beauly, Aigas Forest, M. McC. WEBSTER. *98, Argyll; south-east of Dunstaffnage Castle, 1950, P. McPHERSON, det. F. H. PERRING.

†240/1. TELLIMA GRANDIFLORA (Pursh) Dougl. ex Lindl. 88, Mid-Perth; Dalguise, in a dyke beside a burn, A. DUNCAN.

†242/P. PELTIPHYLLUM PELTATUM (Benth.) Engler. 83, Edinb.; long established in open woodland opposite west entrance to Kirknewton House; by moorland road near Ravelrig, Balerno; island in the river Esk, Penicuik, E. P. BEATTIE.

247/2. DROSERA ANGLICA Huds. 48, Mer.; bog near the Bearded Lake, Aberdovey, with *D. rotundifolia* and *D. intermedia*, A. O. Chater (1960, *Nature in Wales*, **6**, 92). 72, Dumfries; near Auchenstroan Craig, Moniaive, A. McG. STIRLING.

247/2×1. DROSERA ANGLICA × ROTUNDIFOLIA. 46, Cardigan; near the centre of Borth Bog, 2 plants. The leaves were similar in shape to those of *D. intermedia* but much longer (15 × 8 mm.), and the plants were growing with *D. anglica* and *D. rotundifolia* in the very wet *Sphagnum pulchrum* bog where *D. intermedia* is absent. This record confirms previous reports of the hybrid from Borth Bog, P. M. Benoit (1960, *Nature in Wales*, **6**, 91).

§249/1. LYTHRUM SALICARIA L. *106, E. Ross; bank of the Black Water, Garve, 1957, E. MILNE-REDHEAD.

§254/5. EPILOBIUM ROSEUM Schreb. *96b, Nairn; garden weed, Cawdor Castle, 1957, M. McC. WEBSTER.

§†254/6. EPILOBIUM ADENOCAULON Hausskn. *90, Forfar; waste ground, Montrose Links, U. K. DUNCAN, conf. C. C. TOWNSEND.

§254/7. EPILOBIUM ADNATUM Griseb. *107, E. Sutherland; Kildonan, 1957, M. McC. WEBSTER, det. G. M. ASH.

254/7×4. EPILOBIUM ADNATUM × LANCEOLATUM. 24, Bucks.; garden weed, Bourne End, A. F. WOOD, conf. at KEW.

§†254/13. EPILOBIUM NERTERIOIDES Cunn. 79, Selkirk; mouth of the Gala Water, Galashiels, a single plant, 1959: *81, Berwick; bank of the Cleekhimin Burn near its junction with the Leader Water, near Lauder, abundant: 87, W. Perth; railway embankment at road bridge 100 yards west of Callander station, a few plants: 88, Mid Perth; footbridge of Lawers Burn; south-west corrie of Ben Lawers, a few plants, E. P. BEATTIE.

§†256/2. OENOTHERA ERYTHROSEPALA Borbás. *82, Haddington; Gullane Quarry, 1959, E. P. BEATTIE.

259/4. MYRIOPHYLLUM ALTERNIFLORUM DC. 28, W. Norfolk; boundary dyke, Calthorpe Broad Nature Reserve, 1956, A. C. Jermy (1958, *Trans Norf. & Norw. Nat. Soc.*, **18** (7), 17).

262/5. CALLITRICHE HERMAPHRODITICA L. 97, Westerness; ditch, Glen Gowr, 1957, M. McC. WEBSTER.

†266/1. CORNUS MAS L. 22, Berks.; plantation, Rose Hill, H. J. M. BOWEN.

§†280/1. SMYRNIUM OLUSATRUM L. *98, Argyll; sea-coast, Seil, 1957, B.S.B.I. FIELD MEETING, comm. U. K. DUNCAN.

285/4. APIUM INUNDATUM (L.) Reichb. f. 96b, Nairn; pool south of the Loch of the Clans, M. McC. WEBSTER.

§291/1. CARUM VERTICILLATUM (L.) Koch. *47, Montg.; Great Harmon, 1955, E. MILNE-REDHEAD.

§300/1. OENANTHE FISTULOSA L. *45, Pemb.; ditch in Marlocs Mere, T. A. W. DAVIS, conf. A. E. WADE.

300/4. OENANTHE LACHENALII C. C. Gmel. 38, Warwick; Alveeste Pools, 1959, G. A. and M. A. ARNOLD.

§301/1. AETHUSA CYNAPIUM L. *H.30, Cavan; Butler's Bridge, 1958, R. SANDELL.

§†311/2. HERACLEUM MANTEGAZZIANUM Somm. & Levier. *81, Berwick; banks of burn to east of Coldingham village, abundant, 1956; near Duns; banks of Whiteadder, Chirnside: *85, Fife; near Torryburn, several plants, 1957, E. P. BEATTIE.

319/17. EUPHORBIA AMYGDALOIDES L. 48, Mer.; rediscovered on basic rocks near Benglog, north-east of Dolgelley, where it was recorded by E. Price Evans (1945, *J. Ecol.*, **32**, 172), E. B. HARRIS and B.S.B.I.

Field Meeting; rocks in Llaethnant, Pennant Dyf; a new locality, E. Roberts and B.S.B.I. Field Meeting (1960, *Nature in Wales*, **6**, 22).

§320/2. Polygonum raii Bab. ‡28, W. Norfolk; Blakeney Point, F. W. Jane, conf. T. G. Tutin (1958, *Trans. Norf. & Norw. Nat. Soc.*, **18** (7), 15). *73, Kirkcudbr.; dunes, Brighouse Bay, M. McC. Webster.

§320/6. Polygonum bistorta L. *97, Westerness; wood near the river, Achnacavry, 1957, M. McC. Webster.

320/14. Polygonum minus Huds. 9, Dorset; Winfrith Heath, H. J. M. Bowen.

†320/19. Polygonum cuspidatum Sieb. & Zucc. 27, E. Norfolk; by track near river Yare, south of Brundall, A. C. Jermy and P. A. Sims.

†320/20. Polygonum sachalinense F. Schmidt. 83, Edinb.; bank of river Esk, Penicuik, a large patch, E. P. Beattie.

†320/22. Polygonum campanulatum Hook. f. H.1, S. Kerry; well established by banks of a stream near Camp post office, M. McC. Webster, det. C. C. Townsend.

§325/1(3). Rumex tenuifolius (Wallr.) Löve. *73, Kirkcudbr.; sands of Kipford, M. McC. Webster, conf. C. C. Townsend.

†327/1. Helxine soleirolii Req. H.27, W. Mayo; Inniscrone, 1957, D. McClintock; not H.31, Louth, as printed in *Proc. B.S.B.I.*, **3**, 405 (1960).

330/5×1. Ulmus × vegeta (Loud.) A. Ley. 12, N. Hants; between Crondall and Well, A. Berens, det. R. Melville.

343/12b. Salix cinerea subsp. atrocinerea (Brot.) Silva & Sobrinho. 98, Argyll; in marsh behind the cottage, Garbh Eileach, Isles of the Sea, C. W. Muirhead.

343/13. Salix aurita L. 98, Argyll; marshy ground near ruined croft, Garbh Eileach, Isles of the Sea, C. W. Muirhead.

§343/15. Salix phylicifolia L. *73, Kirkcudbr.; bank of Ken Water, near Glenlee Bridge; Poldores Burn, near Beninner, Carsphairn: 75, Ayr; Muck Water, near Dalmellington, A. McG. Stirling.

343/15×16. Salix × schraderana Willd. 90, Forfar; roadside near Delnamer, Glen Isla, 1959, U. K. Duncan, conf. R. D. Meikle.

343/17. Salix lapponum L. 98, Argyll; Beinn an lochain and Beinn chorronach, Arrochar hills, A. G. Kenneth, det. E. C. Wallace.

343/19. Salix arbuscula L. 98, Argyll; Ben Ince, A. G. Kenneth.

§343/20. Salix myrsinites L. *105, W. Ross; frequent on limestone near Sgurr a' Gharaidh, Kishorn, A. A. Slack and A. McG. Stirling.

355/1. ARCTOUS ALPINA (L.) Nied. 105, W. Ross; one plant on Cambrian limestone outcrop, east end of Loch Fada, Kinlochewe, A. A. SLACK and A. McG. STIRLING.

372/4. ANAGALLIS MINIMA (L.) E. H. L. Krause. 45, Pemb.; path in marsh below heath, Tref-Asser, Llanwnda, 1959, T. A. W. Davis, conf. A. E. Wade (1960, *Nature in Wales*, **6**, 20).

374/1. SAMOLUS VALERANDI L. 38, Warwick; bank of river, Charlecote, M. D. G. JONES, comm. R. C. READETT.

†377/1. SYRINGA VULGARIS L. 82, Haddington; Archerfield, Dirleton, long established: 83, Edinb.; Craigmillar Woods, long established, E. P. BEATTIE.

†379/2. VINCA MAJOR L. 82, Haddington; railway embankment, Bielgates, long established: 84, Linlithgow; Dundas Hill, near Kirkliston, long established: 85, Fife; near shore at Inverkeithing, long established, E. P. BEATTIE.

385/1. GENTIANELLA CAMPESTRIS (L.) Börner. 9, Dorset; Winfrith Heath, H. J. M. BOWEN.

385/3. GENTIANELLA AMARELLA subsp. SEPTENTRIONALIS (Druce) Pritchard. 105, W. Ross; several places on limestone grassland, about Elphin and Ledbeg: 106, E. Ross and 107, Sutherland; several places about Loch Ailsh, in both vice-counties, E. C. WALLACE.

†389/N. CYNOGLOSSUM NERVOSUM Benth. ex Hook. f. 33, E. Glos.; a large patch in the newly-made verge of the Gloucester-Ledbury road near Playley Green; although an obvious garden escape, it may well become established and spread, Mrs. E. L. Sell (1960, *N. Glos. Nat. Soc. J.* **11** (9)).

†392/3. SYMPHYTUM ORIENTALE L. 9, Dorset; old orchard, Rampisham, H. J. M. BOWEN. 12, N. Hants.; large clump, margin of lane near Hinton Ampner, C. W. MUSGRAVE BURTON. 24, Bucks; waste corner, Farnham Common, A. F. WOOD.

§392/6. SYMPHYTUM TUBEROSUM L. ‡†4, N. Devon; Alverdiscott, on both sides of the Torrington-Horwood road north of Webbery Cross, plentiful, E. R. S. Winter, comm. C. M. A. Cadell (1959, *Rep. & Trans. Devon Assocn.*, **91**, 184). 38, Warwick; near Pailton, 1959, M. D. G. JONES, comm. R. C. READETT.

†394/1. TRACHYSTEMON ORIENTALIS (L.) G. Don. 9, Dorset; plantation and roadside, Compton Valence, H. J. M. BOWEN.

§†395/1. PENTAGLOTTIS SEMPERVIRENS (L.) Tausch. 82, Haddington; Archerfield, Dirleton, abundant and long established: 83, Edinb.; roadside near Hillend, Edinburgh, abundant and long established: *84, Linlithgow; several plants on Foxhall side of river Almond at Kirkliston, E. P. BEATTIE.

†399/2. PULMONARIA OFFICINALIS L. 9, Dorset; Rampisham, by stream, far from houses, H. J. M. BOWEN. 78, Peebles; Mill Burn, Carlops, a single plant: 83, Edinb.; railway embankment, Juniper Green, several plants: 84, Linlithgow; wood near Carlowrie Farm, Kirkliston, several plants, E. P. BEATTIE.

401/1. LITHOSPERMUM PURPUREOCAERULEUM L. *†23, Oxon, Shirburn, in private grounds, H. J. M. BOWEN.

406/1. CALYSTEGIA SEPIUM (L.) R.Br. 80, Roxburgh; railway fence just outside Newcastleton station, with pink flowers (white form also present), C. W. MUIRHEAD.

§†406/3. CALYSTEGIA SILVATICA (Kit.) Griseb. 82, Haddington; in rocks by the sea, east of North Berwick, 1955, C. W. MUIRHEAD. 83, Edinb.; quarry near Craigmillar Castle, 1955, E. P. BEATTIE and C. W. MUIRHEAD. *95, Moray; banks of river Lassie, near Cooper Park, Elgin, M. McC. WEBSTER.

§†406/P. CALYSTEGIA PULCHRA Brummitt & Heywood. *48, Mer.; by Bontnewydd railway station, near Dolgelley, 1959, R. K. BRUMMITT. *82, Haddington; waste ground West Barns, Dunbar, 1958: 83, Edinb.; hedge near Duddington Crossroads, 1958, E. P. BEATTIE; garden fence, Inverleith Park, Edinburgh, R. MITCHELL. *95, Moray; Greshop Wood, Forres; rough ground, Elgin Common, M. McC. WEBSTER, det. R. K. BRUMMITT. *103, Mid Ebudes; Tobermory, Isle of Mull, E. K. SHAW and C. W. MUIRHEAD. *H.12, Wexford; Giffs Lane, Bunclady, E. BOOTH, det. R. K. BRUMMITT.

†412/1. PHYSALIS ALKEKENGI L. 85, Fife; West Links, St. Andrews, 4 plants, 1958, E. P. BEATTIE.

†415/1. DATURA STRAMONIUM L. 79, Selkirk; Galashiels sewage works, a single plant, 1959: 81, Berwick; Ayton, a single plant in a nursery, 1959, E. P. BEATTIE.

416/10. VERBASCUM VIRGATUM Stokes. †90, Forfar; waste ground near Ninewells, Dundee, U. K. DUNCAN and E. and J. HODGSON, det. C. C. TOWNSEND.

§422/2. KICKXIA ELATINE (L.) Dumort. *†83, Edinb.; waste ground, Borthwick Bank, near Gorebridge, 2 plants, 1958, E. P. BEATTIE.

†425/3. MIMULUS MOSCHATUS Dougl. ex Lindl. 48, Mer.; a fine patch in a stream at the foot of Moel y Calch, Llandderfel, B.S.B.I. Field Meeting (1960, *Nature in Wales*, **6**, 21).

†428/1. ERINUS ALPINUS L. 78, Peebles; plentiful on walls of Neidpath Castle, near Peebles, and on walls in Peebles, 1957: 87, W. Perth; abundant on bridge near Kilmahog, near Callander, 1957, and on walls in Callander, E. P. BEATTIE. 98, Argyll; Clachan Bridge, Isle of Seil, abundant, Mrs. J. S. & C. W. MUIRHEAD.

†430/14. VERONICA PEREGRINA L. 13, W. Sussex; garden weed, Horsham, B. HURST, det. J. E. LOUSLEY, comm. A. BERENS.

EUPHRASIA all det. or conf. by P. F. YEO.

435/1(1). EUPHRASIA MICRANTHA Reichb. 45, Pemb.; grassy heath on Goety Mountain, Rosebush, T. A. W. DAVIS.

435/1(4). EUPHRASIA FRIGIDA Pugsl. 105, W. Ross; Sgurr na Caorachain and Ben Bhan, Applecross, A. McG. STIRLING.

435/1(10). EUPHRASIA CURTA (Fr.) Wettst. 105, W. Ross; on Cambrian limestone, east end of Loch Fada, Kinlochewe, A. McG. STIRLING.

435/1(10×1). EUPHRASIA CURTA × MICRANTHA. 105, W. Ross; on Cambrian limestone, east end of Loch Fada, Kinlochewe, A. McG. STIRLING.

§435/1(12). EUPHRASIA OCCIDENTALIS Wettst. 45, Pemb.; grassy cliff top, St. Brides, 1958, T. A. W. DAVIS. *99, Dunbarton; Ardmore Point, Helensburgh: *105, W. Ross; dune grassland, Little Sand, Gairloch, A. McG. STIRLING.

435/1(15). EUPHRASIA CONFUSA Pugsl. 45, Pemb.; grassy heath on cliff top, Mynydd Morfa, near Mathry, 1959; grass heath on Talfynydd, Mynydd Prescelly, T. A. W. DAVIS. 105, W. Ross; on serpulite grit near Sgurr a' Gharaidh, Lochcarron, A. McG. STIRLING.

§435/1(22). EUPHRASIA ANGLICA Pugsl. *73, Kirkcudbr.; sand workings near Bargrug, Dalbeattie, A. McG. STIRLING.

§437/1. PARENTUCELLIA VISCOSA (L.) Caruel. *†79, Selkirk; mouth of the Gala Water, Galashiels, a single plant, 1959, E. P. BEATTIE.

†439/2. LATHRAEA CLANDESTINA L. 83, Edinb.; long established in a wood behind Logan Cottage, near Flotterstone, E. P. BEATTIE.

440/6. OROBANCHE ELATIOR Sutton. 17, Surrey; a few plants in a rough corner of the former Croydon Airport, J. E. LOUSLEY and D. P. YOUNG.

442/2. UTRICULARIA NEGLECTA Lehm. 96b, Nairn; small pool on moorland between Lochloy House and the sea, M. McC. WEBSTER.

†445/3×5. MENTHA × GENTILIS L. 91, Kincardine; by river South Esk at Upper Northwater Bridge, U. K. DUNCAN, det. C. C. TOWNSEND.

446/1. LYCOPUS EUROPAEUS L. 66, Durham; Urpeth Wood; not seen for many years, and thought to be extinct in the county, J. Thompson (1960, *Vasc.*, **45**, 24).

448/1. THYMUS PULEGIOIDES L. 37, Worcester; Wyre Forest, near the confluence of Dowles Brook with the Severn, J. A. KIERNAN and R. F. TAYLOR.

453/1. Clinopodium vulgare L. 73, Kirkcudbr.; near Tongland quarry, Kirkcudbright, A. McG. Stirling.

§462/3. Lamium hybridum Vill. *82, Haddington; Seafield Dump, Dunbar, a few plants, 1958, E. P. Beattie.

465/1. Galeopsis angustifolia Ehrh. ex Hoffm. 45, Pemb.; railway embankment near Letterston, T. A. W. Davis, det. A. E. Wade.

473/1. Littorella uniflora (L.) Aschers. 17, Surrey; Hedge Court Pond, in profusion, R. A. R. Clarke, comm. D. P. Young.

476/1. Legousia hybrida (L.) Delarb. †82, Haddington; waste ground, Dirleton, a single plant, 1959, E. P. Beattie.

†482/1. Phuopsis stylosa (Trin.) B. D. Jackson. 9, Dorset, Portland, B.S.B.I. Field Meeting.

485/3. Galium mollugo L. 73, Kirkcudbr.; sand quarry near Bargrug, Dalbeattie; roadside near Mossyard, Gatehouse of Fleet, A. McG. Stirling.

§485/3b. Galium mollugo subsp. erectum Syme. *96b, Nairn; roadside near Rahoul school; main road west of Nairn, M. McC. Webster, det. C. C. Townsend.

485/3b×4. Galium mollugo subsp. erectum × verum. 96b, Nairn; roadside near Rahoul school; Geddes, M. McC. Webster, det. C. C. Townsend.

§485/6. Galium pumilum Murr. 100, Clyde Isles; delete record given in *Proc. B.S.B.I.*, **1**, 52 (1954). The specimen on which the record was based has been determined by K. M. Goodway as *G. verum*, B. W. Ribbons.

485/7. Galium sterneri Ehrend. 77, Lanark; Culter Water, Biggar, 1908, D. Patton: 86, Stirling; head of Balglass, Fintry, 1891, J. S. Stirling and R. Kidston: 88, Mid Perth; near summit of Cam Creag, Killin, 1922, D. Patton: 89, E. Perth; Ruaidh Dorch, 1886, P Ewing, all *Herb. Univ. Glasgow*, det. K. M. Goodway, as *G. pumilum* subsp. *septentrionale*, comm. A. McG. Stirling.

§485/10. Galium uliginosum L. *45, Pemb.; ditch in field adjoining marsh, Tref-Asser, L. Lloyd-Evans, det. A. E. Wade, comm. T. A. W. Davis. 48, Mer.; in very small quantity in a base-rich hill bog in Cwm Tylo, near Parc, Bala; not recorded from Merioneth for many years, J. G. Dony and B.S.B.I. Field Meeting.

485/14. Galium parisiense L. 17, Surrey; walls of old farm near Crowhurst, R. A. R. Clarke, comm. D. P. Young.

486/1. Rubia peregrina L. 48, Mer.; one plant on an ivy-covered bank at Barmouth, 100 yards from where the species was recorded in 1863, Mrs. K. M. Benoit (1960, *Nature in Wales*, **6**, 92).

†488/2. VIBURNUM TINUS L. 82, Haddington; naturalised in two places in Archerfield, Dirleton, E. P. BEATTIE

†489/1. SYMPHORICARPOS RIVULARIS Suksd. 82, Haddington; Gifford, and many other parts of the vice-county, long established: 83, Edinb.; abundant and long established in the Balerno district; common throughout the vice-county, E. P. BEATTIE.

†492/1. LEYCESTERIA FORMOSA Wall. 83, Edinb.; Dreghorn and Craigmillar Woods, Edinburgh, long established, E. P. BEATTIE.

†495/2. VALERIANA PYRENAICA L. 72, Dumfries; large colony by roadside, main road about a mile south of Langholm: 83, Edinb.; large colony by river Esk, Penicuik Estate, Penicuik, long established, E. P. BEATTIE

§†503/1. GALINSOGA PARVIFLORA Cav. *83, Edinb.; persistent garden weed, 21A Pitt Street, Edinburgh, 1959; persistent weed for over 60 years at the Royal Botanic Garden, Edinburgh, E. P. BEATTIE.

§†503/2. GALINSOGA CILIATA (Raf.) Blake. ‡3, S. Devon; Dawlish West, flower-bed at entrance to caravan camp, Dawlish Warren, Mrs. V. M. Wilkinson (1959, *Rep. & Trans, Devon Assocn.*, **91**, 183). 23, Oxon.; rubbish-tip, Henley, Mrs. Hodgson (1960 *Reading Nat.*, **12**, 13): garden weed, Headington, H. J. M. BOWEN.

†506/4×7. SENECIO × LONDINENSIS Lousley. 48, Mer.; one plant on the railway crossing between St. Mary's Terrace and Barmouth Junction station, growing amongst abundant *S. squalidus*. *S.viscosus* was absent, but was seen in exactly the same place in 1955 and 1956, P. M. Benoit (1960, *Nature in Wales*, **6**, 93).

†509/3. PETASITES JAPONICUS (Sieb. & Zucc.) F. Schmidt. 16, W. Kent; established along the banks of the brook, an escape from a garden on the opposite (Sussex) side, Groombridge, 1958; recorded in *Rep. Bot. Soc. & E.C.*, **12**, 492 (1944) in error as *P. albus* (L.) Gaertn., D. P. YOUNG.

§†509/4. PETASITES FRAGRANS (Vill.) C. Presl. *81, Berwick; St. Abbs, abundant; near Ayton, a large patch: 85, Fife; Raith, Kirkcaldy, abundant, E. P. BEATTIE.

513/2. PULICARIA VULGARIS Gaertn. 12, N. Hants.; Springwater Farm, near Bramshill Common, Mrs. A. M. SIMMONS.

§514/3. FILAGO SPATHULATA Presl. *†85, Fife; waste ground, Guardbridge, several plants, 1959 and 1960, E. P. BEATTIE.

514/5. FILAGO MINIMA (Sm.) Pers. 101, Kintyre; dunes at Kilmory Bay, Knapdale, A. G. KENNETH.

†519/P. ASTER PETIOLATUS Harv. 22, Berks.; recorded in *Rep. Bot. Soc. & E.C.*, **11**, 31 (1936) as being established on the river wall at Abingdon. The specimen (*Hb. Oxon.*) on which the record is based is *Erigeron mucronatus* DC., and the species still grows on the river-wall near Abingdon Church. *A. petiolatus* has been included as a British plant in error, D. P. YOUNG.

§†526/1. ANTHEMIS TINCTORIA L. 79, Selkirk; Galashiels rubbish-tip, several plants, E. P. BEATTIE. *96b, Nairn; open ground near the river, Nairn, several plants, M. McC. WEBSTER.

§527/1. CHAMAEMELUM NOBILE (L.) All. *†82, Haddington; waste ground, Dirleton, several plants, 1959: *83, Edinb.; waste ground, Borthwick Bank, Gorebridge, several plants, 1959, E. P. BEATTIE.

†534/D. COTULA DIOICA L. H.22, Meath; ineradicable in the tennis-lawns, Pilton, 1957: not *C. squalida* (Hook. f.) Hook. f., as printed in *Proc. B.S.B.I.*, **3**, 412 (1960), D. MCCLINTOCK.

535/8. ARTEMISIA CAMPESTRIS L. †83, Edinb.; Leith Docks, a single plant: †85, Fife; waste ground, Guardbridge, several plants, 1959, E. P. BEATTIE.

§538/1. ARCTIUM LAPPA L. *45, Pemb.; grassy bank by roadside, Camrose Village, T. A. W. DAVIS, conf. F. H. PERRING.

§539/3. CARDUUS NUTANS L. *76, Renfrew; field near Kilmalcolm, E. R. T. CONACHER.

†541/1. SILYBUM MARIANUM (L.) Gaertn. 74, Wigtown, recently disturbed ground, Terally Bay, Drummore, A. McC. STIRLING.

543/1. SAUSSUREA ALPINA (L.) DC. 73, Kirkcudbr.; Beninner, Carsphairn, at c. 1,800 ft.: 105, W. Ross; rock ledges (Epidiorite), at c. 1,000 ft., Bad a' Chreamha, North Strome, A. McG. STIRLING.

†544/2. CENTAUREA MONTANA L. 83, Edinb.; waste ground near Maybury, Corstorphine, Edinburgh, several plants since 1955: 87, W. Perth; woodland behind Callander, a few plants, E. P. BEATTIE.

§†544/3. CENTAUREA CYANUS L. *45. Pemb.; oat stubble at St. Ishmaels, one plant, 1954, T. A. W. Davis (1955, *Nature in Wales*, **1**, 134).

†544/10. CENTUREA SOLSTITIALIS L. 38, Warwick; cultivated field, Dosthill, 1959, G. A. & M. A. ARNOLD, comm. R. C. READETT.

†552/2. TRAGOPOGON PORRIFOLIUS L. 95, Moray; sand dunes near the Yacht Club, Findhorn, 12 plants, E. MILWARD, comm. M. McC. WEBSTER.

†554/4. LACTUCA TATARICA (L.) C. A. Mey. 63, S.-W. York; railway tracks, Otley goods station, 1959-60, F. HOUSEMAN, det. N. Y. SANDWITH.

§555/1. MYCELIS MURALIS (L.) Dumort. 98, Argyll; roadside wall, Benmore, near Dunoon, A. G. KENNETH. *105, W. Ross; old wall, Courthill House, Kishorn, A. A. SLACK and A. McG. STIRLING.

†557/3. CICERBITA MACROPHYLLA (Willd.) Wallr. 81, Berwick; Duns Clump, a single plant, E. P. BEATTIE.

558/1(5). HIERACIUM HOLOSERICEUM Backh. 98, Argyll; Beinn luibhean, Arrochar Hills, a single patch, A. G. KENNETH, det. E. C. WALLACE.

558/1(52). HIERACIUM CARNEDDORUM Pugsl. *48, Mer.; north slope of Cwm Geugraig, Cader Idris, 1954, Mrs. M. RICHARDS, det. P. D. SELL and C. WEST.

558/1(143). HIERACIUM CALEDONICUM F. J. Hanb. *48, Mer.; rocks at Pistyll-y-Cain, near Tyn-y-Groes, 1954, Mrs. M. RICHARDS, det. P. D. SELL and C. WEST.

558/1(158). HIERACIUM DIAPHANUM Fr. 38, Warwick; Edgbaston, J. KIERNAN, det. P. D. SELL and C. WEST.

558/1(219). HIERACIUM PERPROPINQUUM (Zahn) Druce. *48, Mer.; roadside near the bridge, Glasdir, near Dolgelley, 1957, P. M. BENOIT and Mrs. M. RICHARDS, det. P. D. SELL and C. WEST.

†558/2(10). HIERACIUM ARVORUM (Naeg. & Peter) Pugsl. 23, Oxon.; disused railway line, Chinnor-Watlington, Mrs. J. F. MAY.

§567/1. HYDROCHARIS MORSUS-RANAE L. *52, Anglesey; Llyn Llygeirian, R. H. ROBERTS and M. MORRIS.

§†571/1. LAGAROSIPHON MAJOR (Ridl.) Moss. ‡6, N. Som.; basin of the canal, Bath, in small quantity, P. J. M. Nethercott (1960, *Proc. Bristol Nat. Assocn.*, **30**, 20). 16, W. Kent; Brighton Lake, Tunbridge Wells, C. A. STACE, det. D. H. KENT.

§576/3. ZOSTERA NOLTII Hornem. 73, Kirkcudbr.; Sandside, Kirkcudbright; Skyreburn Bay, Gatehouse-of-Fleet: *76, Renfrew; Langbank, Renfrew, A. McG. STIRLING.

POTAMOGETON all det. by J. E. DANDY and G. TAYLOR.

577/5. POTAMOGETON LUCENS L. 98, Argyll; west side of Lochan fearphorn, A. G. KENNETH.

577/6×5. POTAMOGETON × ZIZII Koch. ex Roth. 98, Argyll; Lochan add: 101, Kintyre; Loch Barnlvasgan, A. G. KENNETH.

577/6×9. POTAMOGETON × NITENS Weber. 98, Argyll; Lochan add, A. G. KENNETH.

577/8. Potamogeton praelongus Wulf. 98, Argyll; Lochan add, A. G. Kenneth.

§577/15. Potamogeton berchtoldii Fieb. *73, Kirkcudbr.; near outlet of Clatteringshews Reservoir, A. McG. Stirling.

§580/1. Zannichellia palustris L. *96b, Nairn; Loch Gran, M. Mc. Webster.

584/1. Narthecium ossifragum (L.) Huds. 38, Warwick; Coleshill Bog; confirming old record, J. G. Hawkes, comm. R. C. Readett.

†595/1. Tulipa sylvestris L. 4, N. Devon; near ruined priory, Frithelstock (1959, *Rep. & Trans. Devon Assocn.*, **91**, 186).

§598/1. Ornithogalum umbellatum L. *82, Haddington; Archerfield, Dirleton, several plants, E. P. Beattie.

†598/2. Ornithogalum nutans L. 85, Fife; rough ground on edge of Elie golf course, Mrs. D. Scott.

§†605/2. Juncus tenuis Willd. ‡18, S. Essex; Epping Forest, E. Saunders; Grays, B. T. Ward (1959, *Essex Nat.*, **30**, 166). *28, W. Norfolk; East Winch, 1953; apparently introduced in making the cricket ground. Still present 1960, but not spreading as yet, C. P. Petch and E. L. Swann. 45, Pemb.; near Letterston, T. A. W. Davis, conf. A. E. Wade. 98, Argyll; grassy path, west of ferry, Easdale Island, C. W. Muirhead.

605/22. Juncus bulbosus L. 48, Mer.; floating in a pool by Tabor Chapel, 1½ miles east of Dolgelley, P. M. Benoit.

605/26. Juncus triglumis L. 105, W. Ross; frequent on the limestone, Kishorn; Ben Bhan, Applecross, A. A. Slack and A. McG. Stirling.

§607/5. Allium vineale L. *103, Mid Ebudes; Iona, 1948, K. W. Braid (*Hb. Univ. Glasgow*), comm. A. McG. Stirling. *105, W. Ross; low limestone cliffs near Courthill House, Kishorn, A. A. Slack and A. McG. Stirling.

§†607/11. Allium paradoxum (Bieb.) G. Don. ‡4, N. Devon; road verge, Weare Gifford, L. Lampard-Vachell (1959, *Rep. & Trans. Devon Assocn.*, **91**, 186). *85, Fife; Raith, Kirkcaldy, abundant, E. P. Beattie.

607/12. Allium ursinum L. 98, Argyll; crevices in sea cliffs, Bealach an Tarabairt, Garbh Eileach, Isles of the Sea, C. W. Muirhead.

612/1. Galanthus nivalis L. †82, Haddington; Archerfield, Dirleton, abundant: †85, Fife; Cambo, near Caril, abundant, and elsewhere in the vice-county, E. P. Beattie.

§615/1. Sisyrinchium bermudiana L. ‡†3, S. Devon; Kenton, several clumps in grass verge of Dawlish road, Haldon, R. E. C. Ferreira (1959, *Rep. & Trans. Devon. Assocn.*, **91**, 186).

625/2. Epipactis helleborine (L.) Crantz. 105, W. Ross; rather rare on the limestone near Kishorn, A. A. Slack and A. McG. Stirling.

§625/7. Epipactus atrorubens (Hoffm.) Schult. *105, W. Ross; frequent on the limestone near Kishorn, from sea-level to about 1,500 ft. Rarely with pale green flowers, A. A. Slack and A. McG. Stirling.

628/1. Listera ovata (L.) R.Br. 105, W. Ross; at 1,500 ft. on Cambrian Limestone, near Kishorn, A. A. Slack and A. McG. Stirling.

635/1. Coeloglossum viride (L.) Hoffm. 48, Mer.; near Rhosygwalian, Bala, 34 plants, B.S.B.I. Field Meeting (1959, *Nature in Wales*, **5**, 825); one plant, the same as flowered in 1958, in a meadow near Rhydymain, Dolgelley, B.S.B.I. Field Meeting (1959, *Nature in Wales*, **5**, 825); Tir Stent, near Cross Foxes, Dolgelley, Mrs. H. M. Richards.

637/1. Leucorchis albida (L.) E. Mey. ex Schur. 48, Mer.; one plant near Ty'n Llidiant, Brithdir, by where there was one in 1956 and 1958, Mrs. H. M. Richards (1959, *Nature in Wales* **5**, 825); one plant with *Coeloglossum viride*, near Rhosygwalian, Bala, B.S.B.I. Field Meeting (1960, *Nature in Wales*, **6**, 22).

§643/1. Dactylorchis fuchsii (Druce) Vermeul. *78, Peebles; west side of Portmore Loch, among bushes with *Phalaris arundinacea*, *Potentilla palustris*, *Rumex acetosa*, etc., c. 1,000 ft.: *79, Selkirk; Commonburn Plantation, a mile south of Selkirk, in very young spruce plantation, with *Juncus conglomeratus*, *Lathyrus pratensis*, *Geum rivale*, *Betula pubescens*, etc., c.640 ft., V. S. Summerhayes, comm. P. F. Hunt.

643/3. Dactylorchis incarnata (L.) Vermeul. 98, Argyll; in damp turf among rocks, Bealach an Tarabairt, Garbh Eilach, Isles of the Sea, Mrs J. S. Muirhead.

§643/5. Dactylorchis purpurella (T. & T. A. Stephenson) Vermeul. *78, Peebles; south end of Portmore Loch, among *Deschampsia cespitosa*, *Potentilla palustris*, *Rumex acetosa* and *Anthoxanthum odoratum*, c.1,000 ft., V. S. Summerhayes, comm. P. F. Hunt. *H.11, Kilkenny; swamp at junction of trunk road (T7) with road to Ballincrea, 1956 (*Hb. Kew*), comm. P. F. Hunt.

§649/1. Arum maculatum L. *82, Haddington; roadside bank above river Tyne, near Bolton, 2 plants: 85, Fife; Pitcorthie Wood, many plants; Cambo, a few plants, E. P. Beattie. Remove 85 from brackets *C.F.*—Ed.

654/1. ERIOPHORUM ANGUSTIFOLIUM Honck. 101, Kintyre; damp hilly ground near Stronefield, Knapdale, A. G. KENNETH, det. E. C. WALLACE, as var. *brevisetum* Druce.

654/3. ERIOPHORUM LATIFOLIUM Hoppe. 73, Kirkcudbr.; near Sheilahill, Gelston; near Laggannullan, Gatehouse of Fleet, A. McG. STIRLING. 101, Kintyre; damp slopes, west of Loch Arail, A. G. KENNETH.

655/3. SCIRPUS MARITIMUS L. 101, Kintyre; north-east side of land-locked sea loch at Craiglin, A. G. KENNETH, det. E. C. WALLACE.

§655/9. SCIRPUS TABERNAEMONTANI C. C. Gmel. *105, W. Ross; brackish marsh, Toscaig, near Applecross, A. A. SLACK and A. McG. STIRLING.

659/1. SCHOENUS NIGRICANS L. 45, Pemb.; marsh, St. Nicholas, with *Phragmites communis*, 1959, L. Lloyd-Evans and T. A. W. Davis (1960, *Nature in Wales*, **6**, 20).

§663/1. CAREX LAEVIGATA Sm. *36, Hereford; Nash Wood, Presteign, Mrs. L. E. WHITEHEAD. 96b, Nairn; bog at west end of the reservoir, Geddes; bog by river Findhorn, Dulsie Bridge, M. McC. WEBSTER.

663/8. CAREX DEMISSA Hornem. 98, Argyll; in damp places among rocks, Bealach an Tarabairt, Garbh Eileach, Isles of the Sea, Mrs. J. S. & C. W. MUIRHEAD.

663/33. CAREX LASIOCARPA Ehrh. 73, Kirkcudbr.; Black Loch, near Murray's Monument, Newton Stewart, A. McG. STIRLING.

663/54. CAREX PANICULATA L. 98, Argyll; abundant in marsh behind the cottage, Garhb Eileach, Isles of the Sea, Mrs. J. S. MUIRHEAD.

663/57. CAREX OTRUBAE Podp. 98, Argyll; salt marsh between Cuan Ferry and Easdale, Isle of Seil, C. W. MUIRHEAD.

663/76. CAREX RUPESTRIS All. 105, W. Ross; abundant on the limestone near Sgurr a' Gharaidh, Kishorn, between 1,000 and 1,500 ft., A. A. SLACK and A. McG. STIRLING.

669/2. GLYCERIA PLICATA Fr. 96b, Nairn; by the reservoir, Geddes, and where a ditch enters the river Nairn near the cemetery, M. McC. WEBSTER, conf. C. E. HUBBARD.

670/4. FESTUCA ALTISSIMA All. 95, Moray; ravine running into river Findhorn, Darnaway Castle: 96b, Nairn; gorge of the Cawdor burn, near the castle, M. McC. WEBSTER. 87, W. Perth; Glenny Glen, Port of Monteith, A. McG. STIRLING.

§670/10. FESTUCA VIVIPARA (L.) Sm. ‡65, N.-W. York; near the Winch Bridge: ‡66, Durham; Falcon Clints, in the gorge of the Eggleshope Burn, and along the north bank of the Tees at Winch Bridge:

‡68, Cheviotland; Ross Links, J. W. Heslop-Harrison (1959, *Vasc. (Subst.)*, **44**, 24).

§†671/3. LOLIUM TEMULENTUM L. *73, Kirkcudbr.; rubbish-tip near Blackcraig, Newton Stewart, A. McG. STIRLING, conf. C. E. HUBBARD.

672/1. VULPIA MEMBRANACEA (L.) Dumort. 45, Pemb.; garden weed, St. Ishmaels, 1959, T. A. W. Davis, det. A. E. Wade (1960, *Nature in Wales*, **6**, 21).

§672/5. VULPIA AMBIGUA (Le Gall) More. *6, N. Som.; abundant over several square yards on sand-dunes near Berrow Church, C. I. and N. Y. SANDWITH.

§675/1. NARDURUS MARITIMUS (L.) Murb. ‡17, Surrey; chalky field, Chipstead, in quantity, J. F. & P. C. Hall (1961, *Lond. Nat.*, **40**, 18). 23, Oxon; near Christmas Common, Mrs. Paul (1960, *Reading Nat.*, **12**, 13).

§676/9. POA COMPRESSA L. ‡46, Card.; wall-top, Glyndifi station, A. O. Chater (1960, *Nature in Wales*, **6**, 91). *49, Caern.; wall-top, Glanadda, Bangor: 52, Anglesey; disused limestone quarry near Brynsiencyn, R. H. ROBERTS. *99, Dunbarton; waste ground, Duntocher, near Glasgow, A. McG. STIRLING.

§676/11. POA ANGUSTIFOLIA L. ‡†46, Card.; in some quantity in one place on the railway embankment between Dovey Junction and Glandyfi stations (apparently only on the Cardiganshire side of the county boundary), P. M. Benoit (1960, *Nature in Wales*, **6**, 91).

676/15. POA CHAIXII Vill. 96b, Nairn; woodland, Coulmony, M. McC. WEBSTER.

†680/3. BRIZA MAXIMA L. 90, Forfar; railway siding, Dundee, several plants, Mrs. E. and J. HODGSON and U. K. DUNCAN.

681/2. MELICA NUTANS L. 75, Ayr; rocks near Muck Water, Dalmellington: 88, Mid Perth; rock ledges, hills south of Loch Earn, at 1,800 ft., A. McG. STIRLING. 105, W. Ross; frequent on the limestone, Kishorn, to 1,000 ft., A. A. SLACK and A. McG. STIRLING.

†683/7. BROMUS DIANDRUS Roth. 48, Mer.; railway embankment by Aberdovey station, P. M. Benoit (1960, *Nature in Wales*, **6**, 93).

685/5×3. AGROPYRON × LAXUM (Fr.) Tutin. 52, Anglesey; side of the Newborough-Malltraeth road, near the Forestry Offices; by the sandy track leading from Newborough village to Llanddwyn, P. M. Benoit; shore west of Moel-y-Don, R. H. Roberts (1960, *Nature in Wales*, **6**, 94). 73, Kirkcudbr.; Roadfoot, near Newton Stewart, A. McG. STIRLING, det. C. E. HUBBARD. 91, Kincardine; edge of salt-marsh near St. Cyrus, B.S.B.I. FIELD MEETING, conf. A. MELDERIS, comm. U. K. DUNCAN.

689/1. KOELERIA CRISTATA L. 98, Argyll; in rocky turf at the head of Bealach an Tarabairt, Garbh Eileach, Isle of the Sea, Mrs. J. S. & C. W. MUIRHEAD.

691/1. TRISETUM FLAVESCENS (L.) Beauv. 73, Kirkcudbr.; Brighouse Bay, Borgue, A. McG. STIRLING.

696/4. DESCHAMPSIA SETACEA (Huds.) Hack. 96b, Nairn; small pool on moorland, Achavraat, rare, M. McC. WEBSTER.

§700/1. CALAMAGROSTIS EPIGEJOS (L.) Roth. ‡45, Pemb.; steep, wet cliff slope, Marloes, 1958, T. A. W. Davis, conf. A. E. Wade (1959, *Nature in Wales*, **5**, 791).

§†720/1. SETARIA VIRIDIS (L.) Beauv. *73, Kirkcudbr.; rubbish-tip near Blackcraig, Newton Stewart; Barskimming Mill, Mauchline, A. McG. STIRLING, conf. C. E. HUBBARD.

CHAROPHYTA all det. G. O. ALLEN.

§ NITELLA TENUISSIMA Kuetz. *H.9, Clare; between Loughs Bunny and Atyslang, 1959, M. C. F. PROCTOR and R. B. IVIMEY-COOK.

§ NITELLA CONFERVACEA Braun. *H.9, Clare; Lough George, 1959, M. C. F. PROCTOR and R. B. IVIMEY-COOK.

LAMPROTHAMNIUM PAPULOSUM (Wallr.) Groves. 9, Dorset; The Fleet, near Langton Herring, G. H. ROCKE.

CHARA VULGARIS var. LONGIBRACTEATA Kuetz. 22, Berks.; Cookham Moor, A. F. WOOD.

CHARA TOMENTOSA L. H.23, Westmeath; Loughs Okel and Derravarogh, G. H. ROCKE.

§ CHARA DESMACANTHA Groves & Bull.-Webst. *105, W. Ross; Loch a' Mhuilinn, Applecross, A. McG. STIRLING.

§ CHARA CONNIVENS Braun. *H.9, Clare; Little Templebannagh Lough, 1959, M. C. F. PROCTOR and R. B. IVIMEY-COOK.

§ CHARA DELICATULA Ag. *75, Ayr; Black Loch, between Cumrock and New Cumrock, A. McG. STIRLING. 98, Argyll; Lochan Add, A. G KENNETH.

ABSTRACTS FROM LITERATURE

Compiled by D. H. Kent

Thanks are due to E. B. Bangerter, J. A. Crabbe, A. C. Jermy and A. E. Wade for their assistance.

SYSTEMATIC, ETC.

1→ Pteridophyta. Jermy, A. C., 1960, A revised preliminary Census List of British Pteridophytes, Suppl. *Brit. Fern Gaz.*, **9** (1), 1-12. A list of British ferns and their allies giving vice-county distribution with habitats and synonyms. The nomenclature follows Dandy, *List of British Vascular Plants* (1958), with two amendments agreed to by him, viz. *Thelypteris limbosperma* (All.) H. P. Fuchs for *T. oreopteris* (Ehrh.) Slosson and **Athyrium alpestre** Clairville instead of *A. alpestre* (Hoppe) Rylands.

Corrections and additions to distributional data published in the 1959 Census List are given.—[A.C.J.]

4. Equisetum. Bir, S.S., 1960, Chromosome numbers of some Equisetum species from the Netherlands, *Acta Bot. Neerl.*, **9**, 224-234. Chromosome counts are given for the following Dutch species—*Equisetum arvense* ($n=108$), *E. fluviatile* ($n=108$), *E. palustre* ($n=108$) and *E. trachyodon* ($2n=216$). These counts agree with data published by Manton on counts made on material from elsewhere.—[D.H.K.]

5→ Pteropsida. Brown, C. A., 1960, What is the role of spores in fern taxonomy?, *Amer. Fern J.*, **50**, 6-14.

5→ Pteropsida. Holttum, R. E., 1959, Some notes on vegetative characters of ferns, *Brit. Fern Gaz.*, **9**, 2-4. British genera, *Asplenium*, *Athyrium*, *Dryopteris*, *Polypodium* and *Polystichum* are compared in relation to their vascular systems, shapes of rachis and rachis-junction, scales and hairs.—[A.C.J.]

5→ Pteropsida. Lovis, J. D., 1959, The geographical affinities of the New Zealand pteridophyte flora, *Brit. Fern Gaz.*, **9**, 16-22. The author discusses the distribution of various ferns in the Antarctic, Australasia, S. America and the southern cold-temperate oceanic islands, and suggests that the fern flora was developed before phanerogams, and that their distribution provides evidence in favour of the theory of continental drift. Reference is made to *Asplenium trichomanes* (hexaploid), *Cystopteris fragilis* and *Hymenophyllum wilsonii*.—[A.C.J.]

8/1. Pteridium aquilinum (L.) Kuhn. Whittier, D. P. & Steeves, T. A., 1960, The induction of apogamy in the bracken fern, *Canad. J. Bot.*, **38**, 925-930.

13. Blechnum. Joel, B., 1960, The species of Blechnum in cultivation, *Baileya*, **8**, 102-117. The species of *Blechnum* in cultivation are described, and a key provided to their identification.—[D.H.K.]

14/1. PHYLLITIS SCOLOPENDRIUM (L.) Newm. Faust, M. E., 1960, Survival of Hart's tongue fern in central New York, *Amer. Fern J.*, **50**, 55-62.

15. ASPLENIUM. Meyer, D. E., 1960, Ein neuer Farnbastard: Asplenium × joncheerei (A. obovatum × A. onopteris), *Willdenowia*, **2**, 332-335. Found on Madeira in 1958 by G. J. de Joncheere, this fern is intermediate in appearance between *Asplenium onopteris* (2-ploid) and *A. obovatum* (4-ploid), amongst which it was growing. It is presumed to be a 3-ploid hybrid even though the sori are not sufficiently developed for confirmation. The fact that A. *onopteris* is here regarded by Meyer as a species rather than, as previously, a subspecies will be explained by him in a later paper.—[J.A.C.]

15. ASPLENIUM. Meyer, D. E., 1960, Hybrids in the genus Asplenium found in north-western and central Europe, *Amer. Fern J.*, **50**, 138-145.

15/5. ASPLENIUM TRICHOMANES L. Lovis, J. D., 1960, Asplenium trichomanes: A problem in the taxonomy of polyploids, *Proc. Linn. Soc.*, **171**, 130.

16/1. CETERACH OFFICINARUM DC. Andreas, C.H., 1960, Nogmaals Ceterach officinarum. *Correspondentieblad*, **15**, 161.

21. DRYOPTERIS. Ballard. F., 1960, The correct name for the hybrid Dryopteris cristata × spinulosa, *Amer. Fern J.*, **50**, 105-106. The correct name for the hybrid between *Dryopteris cristata* and *D. spinulosa* is shown to be **D. × uliginosa** (A. Braun ex Doell) Druce.—[D.H.K.]

21.DRYOPTERIS. Karpowicz, W., 1960, Studium porównawcze nad krajowymi przedstawicielami gatunków rodzaju Dryopteris: Thelypteris, *Acta Soc. Bot. Pol.*, **29**, 175-189. A comparative study on the species of the genera *Dryopteris* and *Thelypteris* occurring in Poland.

The species studied in *Dryopteris* are *D. filix-mas*, *D. lanceolato-cristata*, *D. austriaca* and *D. cristata* and in *Thelypteris* are *T. palustris* and *T. limbosperma* (*T. oreopteris*). On p. 185 britles=bristles, fraed=frayed, lists = ridges, and under *Dryopteris* (tertiary veins) would read better as "branched" monopodially or dichotomously, becoming thicker in the teeth"; The chromosome count of $2n=164$ for *Dryopteris* is for the four species under consideration, using *D. filix-mas* in a restricted sense, but some of the elements in the genus with a count of $2n=82$ are mentioned on p. 187. Pp. 184-5 summarise the findings in a tabular manner and the following is a selection of characters which seem clearest cut:—

Gametophyte:	THELYPTERIS (*limbosperma, palustris*)	DRYOPTERIS (*filix-mas, lanceolatocristata, austriaca, cristata*)
shape	cordate with wide rounded lobes	fan-like with deep incision
width	up to 16 mm.	up to 8 mm.
margin	entire	frayed
first embryo	after 66-92 days	after 103-133 days

	THELYPTERIS (*limbosperma, palustris*)	DRYOPTERIS (*filix-mas, lanceolatocristata, austriaca, cristata*)
Sporophyte :		
first frond	after 80 days	after 112-148 days
petiole length	same as lamina or longer	shorter than lamina
groove on petiole	deep	very shallow
number of steles in petiole	2	3-10
fronds	markedly dimorphic	not markedly dimorphic (except *D. cristata*)
epidermal structures	few small evanescent glandules and bristles on lamina	large (0·5-2·5 cm.) brown persistent scales on petioles and veins
sorus	near margin of lamina, lying on both bifurcations of vein	closer to midrib, always lying on anterior bifurcation of vein
indusium	rounded or irregularly cut, evanescent, covered with yellow glandules and bristles	reniform with entire margin, naked, persistent (except *D. austriaca*)
sporangium	with 1-2 glandular yellow-tipped hairs	naked, young sporangia of *D. filix-mas* have on their pedicels 1-2 evanescent small hairs.
chromosome count	$2n=70$ (*T. palustris*) $2n=68$ (*T. oreopteris*)	$2n=164$

21. DRYOPTERIS. Walker, S., 1959, Cytotaxonomic studies of some American species of Dryopteris, *Amer. Fern J.*, **49**, 104-112.

21. DRYOPTERIS. Walker, S., 1960, Evolution within the genus Dryopteris, *Proc. Linn. Soc.*, **171**, 130-132.

21. DRYOPTERIS. Wherry, E. T., 1960, Progress in the study of Dryopteris hybrids, *Amer. Fern J.*, **50**, 87-92.

21/2. DRYOPTERIS BORRERI Newm. Poelt, J., 1960, Dryopteris borreri in Bavaria, *Amer. Fern J.*, **50**, 114-117.

22. POLYSTICHUM. Meyer, D. E., 1960, Zur Gattung Polystichum in Mitteleuropa, *Willdenowia*, **2**, 336-342. Four species—*Polystichum lonchitis*, *P. lobatum*, *P. braunii* and *P. setiferum*, and six hybrids—*P.* × *illyricum*, *P.* × *eberlei*, *P.* × *lonchitiforme*, *P.* × *luerssenii*, *P.* × *bicknellii* and *P.* × *wirtgenii*, are listed, with original references, presumed parentage of hybrids, basionyms and location of illustrations. Figures are given of *P.* × *wirtgenii*, and of a Roth herbarium sheet in the Berlin Herbarium on which Roth himself had mixed *P. lobatum* and *P. setiferum* under the name *P. aculeatum*.—[J.A.C.]

24. THELYPTERIS. See 21. DRYOPTERIS.

29. Ophioglossum. Nishida, M., 1959, Japanese species of Ophioglossum and their nomenclature, *J. Jap. Bot.*, **34**, 33-47. Includes notes on *Ophioglossum vulgatum* and some of its subspecies, and *O. lusitanicum*.—[D.H.K.]

29/2. Ophioglossum lusitanicum L. Dizerbo, A.-H., 1959, L'Ophioglossum lusitanicum L. dans le Massif Armoricain—Ses stations d'Ouessant (Finistère), *Bull. Soc. Sci. Bretagne*, **34**, 75-77. The distribution of *Ophioglossum lusitanicum* in the Massif Armoricain is given together with notes on the habitat and its detailed distribution on the small island, Ouessant, where it is found amongst turf on the cliff tops with *Ulex europaeus* and *Erica cinerea*.—[E.B.B.]

33/1. Pinus sylvestris L. Aytug, B., 1960, Quelques mensurations des pollens de Pinus sylvestris, *Pollen et Spores*, **1**, 305-309.

34. Juniperus. Cucchi, C. C., 1958, Indagine geobotanica sui ginepri europei, *Delpinoa*, **11**, 171-222. Phytogeographic studies on some European species of *Juniperus* and their varieties.—[D.H.K.]

46. Ranunculus. Butcher, R. W., 1960, Notes on water buttercups, *The Nat.*, **1960**, 123-125. The author considers that *Ranunculus peltatus* is a distinct well-defined species, and should not be placed under *R. aquatilis* as done by some recent authors. *R. radians*, on the other hand, cannot, in his opinion, be distinguished with certainty from *R. aquatilis*.

R. pseudo-fluitans (Newbould ex Syme) Baker & Foggitt is a robust plant with long flowering peduncles, and always develops floating leaves during its flowering period. It is abundant in streams and rivers in various parts of Ireland, Wales and south-west England.

A plant usually referred to *R. pseudo-fluitans*, which is found in highly calcareous streams in Britain, is described as **R. calcareus** Butcher, sp. nov. It differs from *R. fluitans* in its more numerous and more slender leaf segments, as well as in its hairy receptacle and long peduncles. It differs from *R. pseudo-fluitans* by its rather less robust stem, longer peduncles and the absence of floating leaves.—[D.H.K.]

46. Ranunculus. Cook, C. D. K., 1960, Batrachium nomenclature. *Mitt. Bot. Staats. München*, **3**, 600-601. The author suggests the reinstatement of the genus *Batrachium* for the species at present placed under *Ranunculus* section *Batrachium*.

The following nomenclatural changes are made **Batrachium omiophyllum** (Ten.) C. D. K. Cook, comb. nov. (*Ranunculus omiophyllus* Ten., *R. coenosus* Guss., *R. lenormandi* F. Schultz); **B. rhipiphyllum** (Bast.) Dumort (*Ranunculus peltatus* Schrank, *R. rhipiphyllus* Bast.); **B. rhipiphyllum** subsp. **sphaerospermum** (Boiss. & Blanche) C. D. K. Cook, comb. nov. (*Ranunculus sphaerospermus* Boiss. & Blanche, *R. peltatus* subsp. *sphaerospermus* (Boiss. & Blanche) Meikle; **B. trichophyllum** (Chaix. ex Vill.) van den Bosch (*Ranunculus trichophyllus* Chaix.)—[D.H.K.]

49. Aquilegia. Prazmo, W., 1960, Genetic studies on the genus Aquilegia L. 1. Crosses between A. vulgaris L. and A. ecalcarata Maxim., *Acta Soc. Bot. Pol.*, **29**, 57-77.

55→ Nymphaeaceae. See 58→ Papaveraceae.

57→ Ceratophyllaceae. See 58→ Papaveraceae.

58→ PAPAVERACEAE. Larsen, K. & Pedersen, A., 1960, Papaveraceernes, Fumariaceernes, Nymphaeaceernes, Ceratophyllaceernes, Elatinaceernes, Halorrhargidaceernes, Hippuridaceernes og Lythraceernes udbredelse; Danmark, *Bot. Tidsskr.*, **56**, 39-86. The distribution of the *Papaveraceae*, *Fumariaceae*, *Nymphaeaceae*, *Ceratophyllaceae*, *Elatinaceae*, *Haloragaceae*, *Hippuridaceae* and *Lythraceae* in Denmark is outlined and discussed.—[D.H.K.]

58. PAPAVER. McNaughton, I. H. & Harper, J. L., 1960, The comparative biology of closely related species living in the same area. 3. The nature of barriers isolating sympatric populations of Papaver dubium and P. lecoqii, *New Phyt.*, **59**, 129-137.

58/6. PAPAVER SOMNIFERUM L. Sárkány, S., Sárkány-Kiss, I., Dános, B. & Farkas, R. L., 1959, Studien über Papaver somniferum L. und Selektionsversuche von Mohnsorten mit grösserer Leistungsfähigkeit für Morphin-und Samenertrag, *Acta Bot. Hung.*, **5**, 97-202.

64→FUMARIACEAE. See 58→ PAPAVERACEAE.

67. BRASSICA. Olsson, G., 1960, Species crosses within the genus Brassica, 1. Artificial Brassica juncea Coss., *Hereditas* **46**, 171-223. 2. Artificial Brassica napus, *loc. cit.*, **46**, 351-386. *Brassica campestris* and *B. nigra* can be crossed on the diploid as well as on the tetraploid level. Crosses on the tetraploid level result in artificial *B. juncea*. On one occasion artificial *B. juncea* appeared directly from a cross between diploids.

Artificial *B. juncea* is ± intermediate between the parent species and agrees very well with the natural species.

Artificial *B. napus* has been synthesized by crosses between *B. campestris* and *B. oleracea*, the crosses being made on the diploid as well as on the tetraploid level.

The artificial hybrids were either morphologically indistinguishable from "wild" *B. napus* or differed only in a few characters, and were often completely fertile.—[D.H.K.]

72. DIPLOTAXIS. Nègre, R., 1960, Le Diplotaxis du Maroc, de Algerie et de la Tunisie, *Mem. Soc. Sci. Nat. Phys. Maroc Bot.*, nouv. sér., **1**, 1-118. Describes and figures the species of *Diplotaxis* found in Algeria, Tunisia, and Morocco. A key is provided to the identification of species.—[D.H.K.]

79/2. LEPIDIUM CAMPESTRE (L.) R.Br. Mitzushima, M., 1959, Lepidium campestre R. Brown, a new alien in Cruciferae, *J. Jap. Bot.*, **34**, 283. *Lepidium campestre* has been found as an adventive in Japan. —[D.H.K.]

84/1. THLASPI ARVENSE L. Corns, W. G., 1960, Combined effects of gibberellin and 2, 4-D on dormant seeds of stinkweed (Thlaspi arvense L.), *Canad. J. Bot.*, **38**, 871-874.

94/4. DRABA MURALIS L. Ratcliffe, D., 1960, Draba muralis L. (Biological Flora), *J. Ecol.*, **48**, 737-744.

95/1. EROPHILA VERNA (L.) Chevall. Harrison, J. W. Heslop, 1960, The range of Erophila verna, *Vasc.*, **45**, 18. Baker & Tate, "New Flora of Durham and Northumberland" (1868) record *Erophila verna* as "common on walls and dry banks", and indicate that it was equally common in lowland and upland habitats. Recent repeated searches for the plant in lowland areas have, however, proved unsuccessful. The reasons for the disappearance of the plant from lowland habitats are obscure.—[D.H.K.]

108/2. SISYMBRIUM IRIO L. Khoshoo, T. N., 1960, Biosystematics of Sisymbrium irio complex, 9. Genome analysis, *J. Indian Bot. Soc.*, **39**, 217-226.

114. POLYGALA. Glendinning, D. R., 1960, Cytology of Polygala, *Nature,* **188**, 604-605.

115. HYPERICUM. Jonker, F. P., 1960, Hypericum canadense in Europe: an addition, *Acta Bot. Neerl.*, **9**, 353. The record of *Hypericum canadense* from Servance (Haute Saône), France, is an error, the plant being another N. American species—the closely related *H. majus*—already reported from Germany.

It is possible that *H. majus* was introduced into France with U.S. military units during World War I.—[D.H.K.]

122. ELATINE. See 58→ PAPAVERACEAE.

123. SILENE. Jones, E. M. Marsden & Turrill, W. B., 1960, Researches on Silene maritima and S. vulgaris, 35. Plants from a serpentine area in Bosnia, *Kew Bull.*, **14**, 241-244.

124/13. SILENE DIOICA (L.) Clairv. Leman, A., 1960, Über Unregelmässigkeiten der Meiose bei Zwitten von Melandrium rubrum, *Ber. Deutsch. Bot. Ges.*, **73**, 167-184.

131. CERASTIUM. Steindórsson, H., 1960, Um fraehyrnu (Cerastium), *Náttúru Fraed.*, **30**, 67-74. A survey is given of E. Hultén's papers on *Cerastium alpinum* and *C. glabratum*, and a short account provided of the species of the *C. alpinum* complex found in Iceland according to these papers.

Samples of Cerastium species from 51 localities in Iceland have been examined, and these revealed that the far most common taxa is *C. alpinum* subsp. *lanatum*. The localities of other species and their varieties are given. It is noted that individuals from a few localities greatly resemble *C. alpinum* subsp. *alpinum*.—[D.H.K.]

133/2. STELLARIA MEDIA (L.) Vill. Clason, E. W., 1960, Muur in de winter, *Natura*, **57**, 23-25. Studies on the growth and flowering of *Stellaria media* during the winter months.—[D.H.K.]

136. SAGINA. Mitzushima, M., 1960, A preliminary revision of the genus Sagina of Japan and its adjacent regions, *J. Jap. Bot.*, **35**, 77-82, 103-107, 193-200 and 257-260. The records of *Sagina* in Japan and northern India are much confused, hence the need for revision. A number of species found in Britain, including *S. saginoides* and *S. intermedia*, are indigenous in the area, while *S. apetala* occurs as a casual adventive. An aberrant form of *S. procumbens* was found in Japan in 1954.

Descriptions of the species are given and a key provided to their identification.—[D.H.K.]

154. CHENOPODIUM. Cole, M. J., 1960, Day length as a factor affecting the variation of Chenopodium species in Britain, *Nature,* **188**, 954-955. *Chenopodium album* and *C. polyspermum* have a range of biotypes in Britain. Both genetic and environmental variables (e.g. temperature and day length) are now known to be responsible for this

polymorphism, and experiments in the laboratory and in the field have elucidated some of the problems involved.—[D.H.K.]

154/1. CHENOPODIUM BONUS-HENRICUS L. Voo, E. E. van der, 1960, Chenopodium bonus-henricus L., *Correspondentieblad*, **17**, 181-182.

156/5. ATRIPLEX LACINIATA L. Hansen, A. & Pedersen, A., 1960, Noter om Dansk flora og vegetation, 15. Sølv-mælde (Atriplex sabulosa Rouy) i Danmark, *Flora og Fauna*, **66**, 44-46.

160. SALICORNIA. König, D., 1960, Beiträge zur Kenntnis der deutschen Salicornien, *Mitt.-Flor.-Soz. Arb.*, **8**, 5-58. A taxonomic revision of the annual species of *Salicornia* found in Germany. Two species only are recognized by the author, **S. brachystachya** G. F. W. Meyer and **S. stricta** G. F. W. Meyer.

The name **S. brachystachya** G. F. W. Meyer, 1824, *Hann. Magaz.*, **19-24**, predates *S. ramosissima* Woods, 1851, and under this species are placed *S. patula* Duval-Jouve, 1868; *S. gracillima* (Townsend) Moss, 1911; *S. pusilla* Moss, 1911 and *S. arborea* Feekes, 1936. Under **S. brachystachya** f. **prostrata** (Pall.) König, are placed *S. oliveri* Moss, 1911; *S. smithiana* Moss, 1911 and *S. appressa* auct. *S. brachystachya* subsp. *gracilis* G. F. W. Meyer is also recorded.

The name **S. stricta** G. F. W. Meyer, 1824, *Hann. Magaz.*, **19-24**, predates *S. dolichostachya* Moss, 1912, and two subspecies are recognised, viz. *S. stricta* subsp. *procumbens* (Smith) G. F. W. Meyer and subsp. *nidiformis* König, subsp. nov.

The cytology, morphology, physiology and ecology of the plants are discussed. *S. brachystachya has* $2n=18$ and *S. stricta* $2n=36$.—[D.H.K.]

168/16. GERANIUM ROBERTIANUM L. Hansen, A. & Pedersen, A., 1960, Noter om Dansk flora og vegetation, 13.—Geranium robertianum ssp. maritimum Bab. i Danmark, *Fauna og Flora*, **66**, 41-42. The distribution of *Geranium robertianum* subsp. *maritimum* in Denmark is discussed and illustrated by a map.—[D.H.K.]

173/1. ACER PSEUDOPLATANUS L. Cooper, R. E., 1957, The Sycamore Tree, *Scot. For.*, **11**, 169-176.

177. EUONYMUS. Barath, Z., 1956, Hazai Euonymusain król, *Bot. Közl.*, **46**, 235-250. New varieties and forms of *Euonymus europaeus*, and other species, are described from Hungary.—[D.H.K.]

187/2. ULEX GALLII Planch. Corillion, R., 1959, Nouvelles précisions sur la répartition d'Ulex Gallii Planch. en Bretagne, *Bull. Soc. Sci. Bretagne*, **34**, 233-236. The general distribution of *Ulex gallii* in north-west France is given, together with some new localities outside its main range.—[E.B.B.]

189 ONONIS. Losa España, T. M., 1958, El género Ononis L. y las Ononis españolas, *An. Jard. Bot. Madrid*, **16**, 227-337. A revision of *Ononis* in Spain, with a key to the identification of species, and many illustrations.—[D.H.K.]

191. MELILOTUS. Shastry, S. V. S., Smith, W. K. & Cooper, D. C., 1960, Chromosome differentiation in several species of Melilotus, *Amer. J. Bot.*, **47**, 613-621.

191. MELILOTUS. Webster, G. T., 1955, Interspecific hybridization of Melilotus alba × M. officinalis using embryo culture, *Agron. J.*, **47**, 138-142.

192. TRIFOLIUM. See 664→ GRAMINEAE.

207. LATHYRUS. Pecket, R. C., 1960, The nature of the variation in flower colour in the genus Lathyrus, *New Phyt.*, **59**, 138-144.

212/12. POTENTILLA CRANTZII (Crantz) G. Beck ex Fritsch. Soják, J., 1960, Potentilla crantzii nový relikt v česke květeně, *Preslia*, **32**, 369-388.

214. DUCHESNEA. Hara, H. & Kurasowa, S., 1959, On the Duchesnea indica group, *J. Jap. Bot.*, **34**, 161-166.

220/1. ALCHEMILLA ALPINA L. Kershaw, K. A., 1960, Cyclic and pattern phenomena as exhibited by Alchemilla alpina, *J. Ecol.*, **48**, 443-453.

221. APHANES. Boros, A., 1956, Az Aphanes microcarpa Magyarország új növénye, *Bot. Közl.*, **46**, 257-259. *Aphanes microcarpa* has been found for the first time in Hungary. Descriptions and figures of both *A. microcarpa* and *A. arvensis* are given.—[D.H.K.]

225. ROSA. Harrison, J. W., Heslop, 1960, Roses and pitheaps, *Vasc.*, **45**, 13.

225/5. ROSA RUGOSA Thunb. Hansen, A. & Pedersen, A., 1960, Noter om Dansk flora og vegetation, 14, Naturalisereae kystforekomster af Kamstsjatka—rose (Rosa rugosa Thunb.), *Flora og Fauna*, **66**, 42-44. *Rosa rugosa* from north-east Asia has been widely cultivated as an ornamental bush, wind-break and game cover in Denmark during the last fifty years. It is also extensively planted along sea-shores and has now begun to spread by natural means to become part of the spontaneous vegetation of sea-shores and outer dunes. A map shows its known distribution in the country.—[D.H.K.]

225/13. ROSA VILLOSA L. Harrison, J. W. Heslop, 1960, Our Rosa villosa populations, *Vasc.*, **45**, 18-19. The author reports a considerable increase of *Rosa villosa* in Durham and Northumberland during the last twenty years, and discusses the variability of the species.—[D.H.K.]

226. PRUNUS. Pénzes, A., 1959, Uj Prunus—Változatok, 2, *Bot. Közl.*, **48**, 52-67. A number of new subspecies of *Prunus avium*, *P. cerasifera* and *P. domestica* are described from Hungary.—[D.H.K.]

229. CRATAEGUS. Lawalrée, A., 1960, Une aubépine méconnue de Belgique et de France: Crataegus calycina Peterm., *Bull. Jard. Bot. Brux.*, **30**, 247-253. Description and distribution of *Crataegus calycina* Peterm. (*C. monogyna* var. *saxatilis* Pierrat) and of the hybrids between this species and *C. monogyna* and *C. oxyacanthoides*.—[E.B.B.]

232. SORBUS. Raatikainen, T., 1960, Fennoskanden Sorbuslajien levinneisyydestä symysta ia systematiikasta. *Luonn. Tutk.*, **64**, 6-10.

235/2. SEDUM TELEPHIUM L. Jalas, J. & Rönkkö, M.T., 1960, A contribution to the cytotaxonomy of the Sedum telephium group, *Arch. Soc. Zool. Bot. Fenn. 'Vanamo'*, **14**, 112-116. Cytotaxonomic studies on the *Sedum telephium* complex: chromosome numbers not previously reported from Finland are *S. telephium* subsp. *ruprechtii* Jalas, $2n=48$;

S. telephium cf. subsp. *purpurascens* (Koch) F. Aresch. (cultivated strain) $2n=48$ and *S. telephium* subsp. *fabaria* (Koch) Syme, $2n=24$.

The Finnish and Russian plant called *S. telephium* subsp. *fabaria* may be a different taxon from the true *S. fabaria* Koch of Germany.—[D.H.K.]

239. Saxifraga. Hamel, J. L., 1960, Matériaux pour l'étude caryotaxonomique des Saxifragacées, 6. Les chromosomes de quatre Saxifrages de la section Hirculus (Haw.) Tausch, *Bull. Mus. Nat. Hist. Nat.*, **32**, 252-257.

243/1. Parnassia palustris L. Andreas, C. H., 1959, Abnormaliteiten bij Parnassia palustris, *De Levende Natuur*, **62**, 247-252.

249. Lythraceae. See 58→ Papaveraceae.

253/1. Ludwigia palustris (L.) Ell. Westhoff, V. & Leeuwen, C. G. Van, 1960, Is het Waterlepeltje (Ludwigia palustris) een oorspronkelijk inheemse soort?, *De Levende Natuur*, **63**, 8-16.

254. Epilobium. Brockie, W. B., 1959, Breeding systems in New Zealand species of Epilobium L., *Trans. Roy. Soc. New Zeal.*, **87**. 189-194.

258. Circaea. Hara, H., 1959, Notes on natural hybrids in the genus Circaea, *J. Jap. Bot.*, **34**, 316-318.

259 → Haloragaceae. See 58→ Papaveraceae.

261. Hippuris. See 58→ Papaveraceae.

262. Callitriche. Savidge, J. P., 1960, The experimental taxonomy of European Callitriche, *Proc. Linn. Soc.*, **171**, 128-130.

263/1. Viscum album L. Tronchet, A. & Mentaut, M. T., 1960, Sur la structure de la plantule du Gui et la nature du suçoir primaire, *Bull. Soc. Hist. Nat. Doubs*, **61**, 87-95. A study of the seedling development of *Viscum album* showing that the haustorium cannot be regarded as a modified root.—[E.B.B.]

269→ Umbelliferae. Cerceau, M.-T., 1959, Clé de détermination d'Ombellifères de France et d'Afrique du Nord d'Apres leurs grains de pollen, *Pollen et Spores*, **2**, 145-190.

269→ Umbelliferae. 'J.G.', 1960, Umbellifers for beginners, *Wild Fl. Mag.*, **329**, 17-18.

298/1. Crithmum maritimum L. Visser, A. de, 1960, De martelgang van Crithmum maritimum L. in Zeeland, *Correspondentieblad*, **17**, 182-184.

302/1. Foeniculum vulgare Mill. Cartier, D., 1960, La méiose et les associations chromosomiques multiples chez le Foeniculum vulgare Gaertn., *Rev. Gen. Bot.*, **67**, 225-242. A detailed account of meiosis in *Foeniculum vulgare* is given. It is demonstrated that $n=11$ is in accord with an original basic number of $n=8$, probably from doubling of three chromosomes.—[E.B.B.]

317. Aristolochia. Huber, H., 1960, Zur Abgrenzung der Gattung Aristolochia L., *Mitt. Bot. Staats. München*, **3**, 531-553.

319→ Euphorbiaceae. Vindt, J., 1960, Monographie des Euphorbiacées du Maroc, *Trav. Inst. Sci. Cherifien, Sér. Bot.*, **19**, i-xxix + 220-528.

320. POLYGONUM. Doida, Y., 1960, Cytological studies in Polygonum and related genera, 1, *Bot. Mag.* (Tokyo), **73**, 337-340. A number of chromosome counts are given on Japanese species of *Polygonum* and related genera, including the following:— *Polygonum persicaria* $2n=40$, *P. aviculare* $2n=60$, *P. nodosum* $2n=22$, *P. cuspidatum* $2n=44$, *P. bistorta* $2n=24$ and *Fagopyrum esculentum* $2n=16$.—[D.H.K.]

320/2. POLYGONUM RAII Bab. Jane, F. W., 1958, Ray's Knotgrass, *Trans. Norf. & Norw. Nat. Soc.*, **18** (7), 15. Gives a description of *Polygonum raii*, and reports its rediscovery at Blakeney Point, Norfolk.—[D.H.K.]

320/9. POLYGONUM PERSICARIA L. Doida, Y., 1960, Developmental studies in the genus Polygonum 1. Microsporogenesis of Polygonum persicaria L., *Bot. Mag.* (Tokyo), **73**, 278-282.

325. RUMEX. Swietlinska, Z., 1960, Spontaneous polyploidization in Rumex hybrids, *Acta Soc. Bot. Pol.*, **29**, 79-98.

330. ULMUS. Melville, R., 1960, The names of the Cornish and the Jersey Elm, *Kew Bull.*, **14**, 216-218. The correct name for the Jersey Elm, formerly known as *Ulmus stricta* var. *goodyeri* Melville, is **U. angustifolia** var. **angustifolia,** and that of the Cornish Elm, formerly known as *U. stricta* Lindl. is **U. angustifolia** var. **cornubiensis** (Weston) Melville, comb. nov.—[D.H.K.]

333. MYRICA. Hild, J., 1960, Verschiedene Formen von Myrica-Beständen am unteren Niederrhein, *Ber. Deutsch. Bot. Ges.* **73**, 41-49.

335. BETULA. Bialebrzeska, M. & Truchanowiczówna, J., 1960, Zmiennośc kształtu owócow i łusek Europejskich brzóz (Betula L.) oraz oznaczanie ich w stanie Kopalnym, *Monogr. Bot.*, **9** (2), 3-93. Studies on the variability in shape of fruits and scales of the European species of *Betula* and of their determination in fossil materials.—[D.H.K.]

341. QUERCUS. Melville, R., 1960, A metrical study of leaf-shape in hybrids, 2. Some hybrid oaks and their bearing on Turing's theory of morphogenesis, *Kew Bull.*, **14**, 161-177.

341/4. QUERCUS PETRAEA (Mattuschka) Liebl. Ovington, J. D. & MacRae, J. D., 1960, The growth of seedlings of Quercus petraea, *J. Ecol.*, **48**, 549-555.

344→ ERICACEAE. Oldfield, F., 1959, The pollen morphology of some of the west European Ericales, *Pollen et Spores*, **1**, 19-48. Preliminary descriptions are given, and a key provided, to the identification of pollen grains of west European species of *Ericaceae* and *Pyrolaceae*.—[D.H.K.]

356/1. CALLUNA VULGARIS (L.) Hull. Gimingham, C. H., 1960, Calluna vulgaris (L.) Hull (Biological Flora), *J. Ecol.*, **48**, 455-483.

359→ PYROLACEAE. See 344→ ERICACEAE.

364. EMPETRUM. Löve, D., 1960, The red-fruited crowberries in North America, *Rhodora*, **62**, 265-292.

370. LYSIMACHIA. Ingram, J., 1960, Notes on the cultivated Primulaceae, 1. Lysimachia, *Baileya*, **8**, 84-97. Describes and keys the species of *Lysimachia* known to be in cultivation.—[D.H.K.]

372. ANAGALLIS. Jones, E. Marsden & Weiss, F. E., 1960, The genetics and pollination of Anagallis arvensis subsp. arvensis and A. arvensis subsp. foemina, *Proc. Linn. Soc.*, **171**, 27-29.

372. ANAGALLIS. Martinoli, G., 1959, Tassonomia ed ecologia delle specie del genere Anagallis della Sardegna, *Webbia*, **15**, 1-45. Studies on the taxonomy and ecology of the *Anagallis* species found in Sardinia, including *A. arvensis* and some of its subspecies.—[D.H.K.]

373/1. GLAUX MARITIMA L. Goday, S.-R. & Galiano, E.F., 1958, Glaux maritima L. en las praderas salinas de la alta Meseta Ibérica, *An. Jard. Bot. Madrid*, **16**, 505-509. The distribution and ecology of *Glaux maritima* in Spain and Portugal is discussed.—[D.H.K.]

382. CENTAURIUM. Jakobsen, K., 1960, Centaurium glomeratum i Danmark, *Bot. Tidsskr.*, **56**, 89-104.

403/1. ECHIUM VULGARE L. Ooststroom, S. J., van. 1959, Een abnormale slangekruidplant, *Natura*, **56**, 133-134. An account of a fasciated form of *Echium vulgare*.—[D.H.K.]

406/3. CALYSTEGIA SILVATICA (Kit.) Griseb. Scholz, H., 1960, Notiz über Calystegia sylvestris (Willd.) Roemer & Schultes, *Willdenowia*, **2**, 398-401. The distribution of *Calystegia silvatica* in Germany and Poland is given.

The author considers that *C. pulchra* Brummitt & Heywood is a pink-flowered variety of *C. silvatica* (*sylvestris*), and reduces it to **C. sylvestris** var. **pulchra** (Brummitt & Heywood) Scholz, comb. nov.—[D.H.K.]

413/5. SOLANUM TRIFLORUM Nutt. Ooststroom, S. J. van, 1959, Solanum triflorum Nutt. in Nederland, *Natura*, **56**, 153-154.

413/R. SOLANUM ROSTRATUM Dunal. Kárpáti, I. & I., 1959, Das vorkommen von Solanum rostratum Dun. in Ungarn, *Bot. Közl.*, **48**, 68.

415/1. DATURA STRAMONIUM L. Turrill, W. B., 1960, The Thorn-apple, *Adv. Sci.*, **17**, 93-94.

416. VERBASCUM. Damler, T. A., 1960, Cytogenetic studies on six Verbascum species and their hybrids, *Genetica* **31**, 241-328. Cytogenetic studies on *Verbascum blattaria*, $2n=36$; *V. gnaphalodes*, $2n=36$; *V. lychnitis*, $2n=34$; *V. phlomoides*, $2n=34$; *V. phoeniceum* $2n=36$ and *V. virgatum*, $2n=66$. All six species have been crossed mutually, though hybrids with *V. virgatum* were not easily obtained.

V. phlomoides × *lychnitis* and its reciprocal cross produced a quantity of seeds from which reasonably fertile F_2 plants were grown.—[D.H.K.]

421/1. CHAENORRHINUM MINUS (L.) Lange. Luther, H., 1960, Om fynden av Chaenorrhinum minus (L.) Lge. i Finland, *Mem. Soc. Fauna Flora Fenn.*, **35**, 73-88. *Chaenorrhinum minus* has been known as an introduced plant in Finland for over 200 years, and occurs about railways, docks and as a garden weed. The common plant is *C. minus* var. *minus* (=var. *balticum* Hayek), but var. *viscidum* (Moench) Hayek from south-west Europe has been introduced with ballast, and var. *creticola* Sirjaev from east Europe has been recorded on a few occasions.

A list of all known Finnish records of the various taxa is given.—[D.H.K.]

430/24. VERONICA FILIFORMIS Sm. Fournier, P., 1959, L' acheminement en France du Veronica filiformis Smith. *Le Monde des Plantes*, **327**, 1-2.

430/24. Veronica filiformis Sm. Hyvämäki, M., 1960, Veronica filiformiksen pohjoisin esiintymä vimpelissä (EP), *Luonn. Tutk.*, **64**, 21.

430/24. Veronica filiformis Sm. Ooststroom, S. J. van, 1959, Veronica filiformis Sm., de Draadereprijs in Nederland, *Natura*, **56**, 139-140. Gives a number of records for *Veronica filiformis* in the Netherlands, and requests further information on its distribution in the country.—[D.H.K.]

430/24. Veronica filiformis Sm. Ooststroom, S. J. van, 1960, Nog eens de draadereprijs, Veronica filiformis Sm., *Natura*, **57**, 97. Gives further distributional records of *Veronica filiformis* in the Netherlands. —[D.H.K.]

430/24. Veronica filiformis Sm. Soják, J. & Sourek, J., 1959, Veronica filiformis Sm. v Československu, *Preslia*, **31**, 421-424. The occurrence of *Veronica filiformis* as an established escape in Czechoslovakia is reported. It was first noted in eastern Bohemia in 1941, and is now known from various other parts of the country.—[D.H.K.]

433. Rhinanthus. Kunz, H., 1959, Bemerkungen zu einigen Rhinanthus-Sippen, *Phyton*, **8**, 243-258.

441.→ Lentibulariaceae. See 472→ Plantaginaceae.

446/4. Mentha aquatica L. Sacco, T. 1959, Ricerche sui caratteri botanici e sulle essenze di alcune varietá di Menta (*sic*) aquatica L. spontane in Piemonte, *Allionia*, **5**, 195-217. Studies on some varieties of *Mentha aquatica* found in Italy.—[D.H.K.]

448. Thymus. Bonnet, A. L. M., 1960, Etude caryologique de quelques Thymus méditerranées, *Natur. Monspel.* **10**, 3-6.

448. Thymus. Shimoya, C., 1952, Note sur la caryologie de quelques espèces du genre Thymus L. de France, *Rec. Trav. Lab. Bot. Geol., Zool. Fac. Sci. Montpell., Sér. Bot.*, **5**, 87-91.

452. Acinos Fernandes, R., 1959, As plantas Portuguesas da secçao Acinos (Moench) Briquet do género Satureja L., *Bol. Soc. Brot.*, **33**, 119-143.

472→—Plantaginaceae. Hansen, A., 1960, Plantaginaceernes og Lentibulariaceernes udbredelse i Danmark, *Bot. Tidssk.*, **56**, 1-35. A detailed account of the distribution of the species of Plantaginaceae and Lentibulariaceae in Denmark.—[D.H.K.]

485/5. Galium saxatile L. Luther, H., 1960, Om fynden av Galium saxatile L. i Finland, *Mem. Soc. Fauna Flora Fenn.*, **35**, 91-95. The Finnish records of *Galium saxatile* are reviewed and discussed.—[D.H.K.]

487/3. Sambucus racemosa *L.* Jansen, M. T., 1960, Sambucus racemosa L. in Zuidoostelijk Utrecht, *Correspondentieblad*, **15**, 168-169.

501→ Compositae. Leppik, E. E., 1960 Evolution differentiation of the flower head of the Compositae, *Arch. Soc. Zool.-Bot. Fenn. 'Vanamo'*, **14**, 162-181.

506/8. Senecio vulgaris L. Cooper, G., 1960, Observations on the recent spread of the rayed form of Senecio vulgaris in the Emscote area of Warwick, *Warwick N.H.S. Ann. Rep.*, **6**, 29-30.

506/16. SENECIO PALUSTRIS (L.) Hook. Bakker, D., 1960, Senecio congestus (R.Br.) DC. in the Lake Yssel Polders, *Acta Bot. Neerl.*, **9**, 235-259.

512/2. INULA SALICINA L. Ooststroom, S. J. van, 1960, Inula salicina L. de wilgebladalant in Nederland, *Natur. Maandbl.*, **49**, 74-76.

521. ERIGERON. Montgomery, F. H. & Shung-Jun Yang, 1960, Cytological studies on the genus Erigeron, *Canad. J. Bot.*, **38**, 381-386.

532/1. MATRICARIA RECUTITA L. Máthé, I., 1960, A Matricaria Chamomilla L. var. salina Schur taxónomia Kérdéséhez, *Bot. Közl*, **48**, 258-260.

535. ARTEMISIA. Wendelberger, G., 1960, Die Sektion Heterophyllae der Gattung Artemisia, *Bibl. Bot.*, **125**, 1-193.

544/6. CENTAUREA NIGRA L. Harrison, J. W. Heslop, 1960, The flowers of the Black Knapweed (Centaurea nigra), *Vasc.*, **45**, 23-24. Notes on a radiate form of *Centaurea nigra* found in several parts of Durham.—[D.H.K.]

544/c. CARTHAMUS. Ashri, A. & Knowles, P. F., 1960 Cytogenetics of Safflower (Carthamus L.) species and their hybrids, *Agron. J.*, **52**, 11-17.

554. LACTUCA. Lindqvist, K., 1960, Inheritance studies in lettuce. Hereditas, **46**, 387-440.

554. LACTUCA. Lindqvist, K., 1960, On the origin of the cultivated lettuce. *Hereditas*, **46**, 319-350. An account of the taxonomy of the *serriola* group of *Lactuca* is given with special reference to the characters separating *L. serriola* and *L. sativa*, and to the primitive forms of the latter species. The nature of these forms and their bearing on the origin of cultivated lettuce is discussed in the light of cytological and genetical results presented in earlier papers. A theory entailing hybridization between different species and evolution along the lines suggested by Anderson (1949) is preferred to the generally accepted theory of direct descent of *L. sativa* from *L. serriola*.—[Author's summary]

558. HIERACIUM. Turesson, G. & B., 1960. Experimental studies in Hieracium pilosella L. I. Reproduction, chromosome number and distribution, *Hereditas*, **46**, 717-736.

559/1. CREPIS FOETIDA L. Chevassus, P., 1960, Un aspect peu connu de la Barkhausie Fétide, *Bull. Soc. Hist. Nat. Doubs*, **61**, 126. A previous note by the author (*Bull. Sci. Bourg.*, **1957**) recorded the appearance of *Crepis foetida* with erect capitula at all stages of development, a character considered by Babcock to be normal, in opposition to most European Floras. It is suggested that this could be a recent mutation which is spreading.—[E.B.B.]

560. TARAXACUM. Fürnkranz, D., 1960, Cytogenetische Untersuchungen an Taraxacum in Raume von Wien, *Österr. Bot. Zeitschr.*, **107**, 310-350.

567→ HYDROCHARITACEAE. Mason, R., 1960, Three waterweeds of the family Hydrocharitaceae in New Zealand, *New Zeal. J. Sci.*, **3**, 382-395. *Elodea canadensis* was introduced into New Zealand about 1868, and is now widespread in streams and lakes; it did not, however, spread with the explosive rapidity that it showed in the British Isles.

Two other adventive water weeds are reported; *Egeria densa*, first noted in 1946, is now locally plentiful; *Lagarosiphon major* has been known since 1950, but is less widespread than the previous species. Descriptions of the three species are provided, together with their detailed distribution in New Zealand. The following key is provided to their identification in a vegetative state: —

1. Leaves alternate, recurved, stiff..*Lagarosiphon major*
   Leaves in whorls, not recurved, lax.. 2
2. Leaves in whorls of 2-3, 5-12 mm. long..*Elodea canadensis*
   Leaves in whorls of 4-5, 11-30 mm. long..*Egeria densa*

—[D.H.K.]

574/2. TRIGLOCHIN MARITIMA L. Binet, P., 1960, Dormances primaire et secondaire des semences de Triglochin maritimum L.: action du froid et de la lumière, *Bull. Soc. Linn. Normandie*, **10**, 131-142. Experiments in fresh water show that the action of cold and light have a considerable influence on the germination of the seeds of *Triglochin maritima*.—[E.B.B.]

574/2. TRIGLOCHIN MARITIMA L. Hara, H., 1960, Notes on Triglochin maritimum of Japan, *J. Jap. Bot.*, **35**, 190-192. At least two races of *Triglochin maritima* occur in Japan. The northern race, is morphologically very similar to the common form of *T. maritima* found in Europe, but is a high polyploid with $2n=120$. The other race, distributed in western Japan, has scapes often shorter than its soft elongate leaves, and narrow oblong capsules with recurved style and small stigma, and contrary to Löve's presumption has the same chromosome number as the European form—$2n=48$. *T. maritima* subsp. *asiatica* Kitagawa, described from southern Manchuria, has not been studied cytologically.—[D.H.K.]

605. JUNCUS. Segal, S., 1960, Een vooronderzoek naar de systematische positie van Juncus ambiguus Guss., *Correspondentieblad*, **16**, 169-172.

605/8. JUNCUS INFLEXUS L. Hoekstra, O. & Ploeg, D.T.E. van der, 1960, Juncus inflexus L. in Friesland, *Correspondentieblad*, **17**, 178-180.

605/8. JUNCUS INFLEXUS L. Reichgelt, T. J., 1960, De verspreiding van Juncus inflexus L. in Nederland, *Correspondentieblad*, **16**, 172-174.

606/8. LUZULA CAMPESTRIS (L.) D.C. Buchanan, J., 1960, Luzula campestris (L.) D.C., *Proc. Linn. Soc.*, **171**, 126-128.

614. NARCISSUS. Hilliard, B. R., 1959, The ancestors of modern daffodils, *Gard. Chron.*, **146**, 269 & 297.

628/2. LISTERA CORDATA (L.) R.Br. Stapelveld, E., 1960, Listera cordata (L.) R.Br. in Drente, *Correspondentieblad*, **15**, 160-161.

643. DACTYLORCHIS. Harrison, J. Heslop-, 1959, Apomictic potentialities in Dactylorchis, *Proc. Linn. Soc.*, **170**, 174-178.

644/1. ACERAS ANTHROPOPHORUM (L.) Ait. F. Dupontreué, G., 1959, Une orchidée rare en Picardie, Aceras anthropophorum (L.) Aiton, *Bull. Trim. Fed. Franc. Soc. Sci. Nat.*, **19**, 69-70. Three recent records for this orchid in the Somme are given; some history of its earlier records is also given to indicate its rarity.—[E.B.B.]

646/1. ACORUS CALAMUS L. Máthé, I., 1959, Über die Standdortverhältnisse von Acorus calamus L. und dessen Vorkommen in Ungarn, *Acta Bot. Hung.*, **5**, 79-85.

649. ARUM. Prime, C. T., 1960, *Lords and Ladies.* iv + 241. Collins. New Naturalist Series. London. Price 21/-.

650. LEMNA. Czopek, M., 1960, Hodowla polskich gatunków z rodziny Lemnaceae w warunkach laboratoryjnich, *Acta Biol. Cracov., Sér. Bot.*, **2**, 14-23. An account of cultivation experiments in the laboratory on Polish species of *Lemnaceae*, viz. *Lemna minor*, *L. gibba*, *L. trisulca*, *L. polyrhiza* and *Wolffia arrhiza*.—[D.H.K.]

651/1. WOLFFIA ARRHIZA (L.) Hork. ex Wimm.—See 650 LEMNA.

652. SPARGANIUM. Beal, O. E., 1960, Sparganium (Sparganiaceae) in the south eastern United States, Brittonia, **12**, 176-181. Describes and gives a key to the identification of the three species of Sparganium found in the south-eastern United States—*S. americanum* Nutt., *S. androcladum* (Engelm.) Morong and *S. chlorocarpum Rydb.* Distribution maps of the species are provided.—[D.H.K.]

655/5. SCIRPUS HOLOSCHOENUS L. Wright, F. R. Elliston-, 1960, Note on Holoschoenus vulgaris, *Rep. & Trans. Devon. Assocn.*, **92**, 366.

656/2. ELEOCHARIS ACICULARIS (L.). Roem. & Schult. Ehrle, E. B., 1960, Eleocharis acicularis in acid mine drainage, *Rhodora*, **62**, 95-97. Details are given of the occurrence of *Eleocharis acicularis* in the waste streams from mines in Pennsylvania. The conditions are highly acid with pH values ranging from 3·0-5·8, and *E. acicularis*, frequently growing in abundance, is invariably the only semi-aquatic species present.—[D.H.K.]

656/5. ELEOCHARIS PALUSTRIS (L.) Roem. & Schult. Strandhede, S. O., 1960, A note on Scirpus palustris L., *Bot. Not.*, **113**, 161-171. Examination of the Linnean herbarium revealed two sheets labelled *Eleocharis* (*Scirpus*) *palustris*; neither are that species. One is *Scirpus mamillatus* Lindb. f., the other is *Eleocharis* (*Scirpus*) *multicaulis*. Neither is thus suitable as the type of *E. palustris*.

The specimen chosen as lectotype was available to Linnaeus during the preparation of his *Species Plantarum*, edition 1, and belongs to *E. palustris* sensu stricto Morphologically and anatomically it belongs to the group which has the chromosome number $2n=16$, and which was named *E. palustris* subsp. *microcarpa* Walters, this must now be called **E. palustris** subsp. **palustris.**

No specimen belonging to the $2n=38$ group was found in the Linnean herbarium, but it must be regarded as a subspecies, and its correct name is **E. palustris** subsp. **vulgaris** Walters.—[D.H.K.]

663/54 × 71. CAREX × BOENNINGHAUSIANA Weihe. Voo, E. E. van der, 1960, Carex × boenninghausiana Weihe, *Correspondentieblad*, **17**, 177-178.

664→ GRAMINEAE. Bowden, W. M., 1960, An experimental taxonomist examines the classification of grasses, *Rev. Canad. Biol.*, **19**, 279-292.

664→ GRAMINEAE. Bowden, W. M., 1960, Chromosome numbers and taxonomic notes on northern grasses, 3. Twenty-five genera, *Canad. J. Bot.*, **38**, 541-547. Taxonomic notes and chromosome numbers are given on a number of Canadian grasses, including *Agrostis canina*, $2n=14$; *A. gigantea*, $2n=42$; *A. stolonifera* (as *A. palustris*), $2n=30$; *A. tenuis*, $2n=28$, 32 and 34; *Alopecurus aequalis*, $2n=14$; *A. alpinus*, $2n=105$, 112 and 119; *A. geniculatus*, $2n=28$; *A. pratensis*, $2n=28$; *Anthoxanthum odoratum*, $2n=20$; *Calamagrostis neglecta*, $2n=28$; *Deschampsia cespitosa*, $2n=26$, 27 and 28; *D. flexuosa*, $2n=28$ and 32; *Hierochloe odorata*, $2n=56$; *Koeleria cristata*, $2n=14$; *Milium effusum*, $2n=28$; *Nardus stricta*, $2n=30$; *Phalaris arundinacea*, $2n=28$; *Phleum alpinum*, $2n=28$; *Sieglingia decumbens*, $2n=36$, and *Trisetum flavescens*, $2n=28$.—[D.H.K.]

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664→ Gramineae. Hansen, A. & Pedersen, A., 1960, Noter om Dansk flora og vegetation, 12. Nogle græsser, der er trafikspredt over Vore grænsestationer, *Flora og Fauna*, **66**, 33-41. *Setaria viridis*, *Digitaria ischaemum*, *D. sanguinalis* and *Eragrostis pooides* are often found in the vicinity of railways in Denmark, and it is probable that their distribution is being influenced by railway traffic. *D. sanguinalis* subsp. *pectiniformis* is largely confined to railway premises where it is established, while *D. sanguinalis* subsp. *sanguinalis* and *E. pooides* are as yet ± casual in occurrence.—[D.H.K.]

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664→ Gramineae. Wray, M. B., 1960, Chromosome numbers and taxonomic notes on northern grasses 2. Tribe Festuceae, *Canad. J. Bot.*, **38**, 117-131. Taxonomic notes and cytological data are given on a number of grasses, mainly from Canada, including *Bromus inermis*, $2n=56$; *Dactylis glomerata*, $2n=28$, and *Festuca rubra*, $2n=42$.—[D.H.K.]

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683/3. Bromus benekenii (Lange) Trimen. Repo, R., 1960, Eine überraschende Disjunktion von Bromus benekenii im östlichen Fennoskandien, *Arch. Soc. Zool.-Bot. Fenn. 'Vanamo'*, **14**, 181-190.

683/20. BROMUS WILLDENOWII Kunth. Raven, P. H., 1960, The correct name for Rescue Grass, *Brittonia*, **12**, 219-221. An examination of the type specimen of *Bromus unioloides* Kunth has shown that it is in fact the species that has been called *B. haenkeanus* (Presl) Kunth. The earliest available name for the plant known as *B. unioloides* Kunth is therefore **B. willdenowii** Kunth, 1829, *Rév. Gram.*, **1**, 134, based on *Festuca unioloides* Willd., 1803, *Hort. Berol.*, **3**, pl. 3.—[D.H.K.]

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H. 16, W. Galway. Boatman, D. J., 1960, The relationships of some bog communities in western Galway, *Proc. Roy. Irish Acad.*, **61** *Sect. B.*, 141-166. Three types of bog community commonly found in west Galway are *Schoenetum nigricantis*, *Sphagnetum* and what Tansley (1939) refers to as "mixed bog". On exposed rock a form of *Callunetum* develops. An attempt has been made to elucidate the relationships between these community types from a study of two areas of bog, one in the extreme west, near Roundstone, and the other near Screeb. Data on the exchangeable Sodium, Potassium, Calcium, Magnesium and Iron, water and ash contents of the surface and subsurface peats are presented and used in the interpretation, and the physical composition of the peat has also been studied.

Schoenus nigricans and *Molinia caerulea* encroach on a lake surface and form a floating mat of vegetation. This is subsequently invaded by *Sphagnum* species which eventually become dominant in the community. It is possible that this *Sphagnetum* is eventually transformed into "mixed bog". As the *Sphagnetum* develops the content of exchangeable Calcium and Iron drops, but Sodium and Potassium remain constant.

Callunetum on the rock outcrops is overgrown by bog which develops in the valleys between, and this community is thus eventually transformed into "mixed bog" which may represent the confluence of the hydrosere and the xerosere.—[Author's Summary.]

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Podbielkowski, Z., 1960, Zarastanie dolow potorfowych, *Monogr. Bot.* (Poland), **10**, 3-144. Studies on the development of vegetation in peat pits in Poland.—[D.H.K.]

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Virot, R., 1960, Deux Composées américaines adventices dans la Double périgourdine, *Cahiers des Nat.,* **16**, 47-55. Two American aliens, *Solidago graminifolia* (L.) Salisb. and *Madia sativa* Molina, are described in detail, with systematic, ecological and distributional data. Each is illustrated by a full page drawing.—[E.B.B.]

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EXHIBITION MEETING, 1960

An Exhibition Meeting was held at the Chelsea College of Science and Technology, on Saturday, November 26, 1960, from noon to 5.30 p.m.

About 300 members and guests attended, and exhibits were arranged by 34 individuals and institutions. An account of these exhibits, based on notes supplied by exhibitors, is given below.

SCOTTISH ALIEN PLANTS

Herbarium specimens were exhibited of alien plants which have occurred in Scotland between 1955 and 1959, viz. (a) Esparto grass aliens from Tunisia and Tripoli at a paper mill in Fife—*Eruca sativa* Mill., *Matthiola trimestris* (L.) R.Br., *Carrichtera annua* (L.) Aschers., *Biscutella laevigata* L., *Herniaria cinerea* DC., *Amaranthus thunbergii* Moq., *Erodium laciniatum* (Cav.) Willd., *Plantago lagopus* L., *Scabiosa maritima* L., *Anacyclus valentinus* L., *Amberboa muricata* DC., *Sonchus tenerrimus* L., *Leontodon salzmannii* (Sch.-Bip.) Ball, *Picris sprengeriana* (L.) Poir., *Loeflingia hispanica* L. and *Cutandia philistaea* (Boiss.) Benth. (b) Wool aliens from Galashiels Sewage Works—*Physalis ixocarpa* Brot., *Xanthium spinosum* L., *Koeleria phleoides* Pers., etc., and (c) Grain aliens from the Lothians, including *Astragalus cicer* L., which the exhibitor had ascertained originally arrived in a consignment of Russian grain almost thirty years ago.—Miss E. B. BEATTIE.

MORE *STELLARIA* HYBRIDS

This exhibit comprised specimens of *Stellaria neglecta* Weihe, *S. media* (L.) Vill., and *S. pallida* (Dumort.) Piré, and of three synthesised hybrids each having all these species in their recent ancestry. The hybrids, which were raised from primary hybrids shown at the 1958 exhibition meeting, were as follows:—

S. (*pallida* × *neglecta*) × (*pallida* × *media*) F_1. A hairy plant resembling *S. media* in its size and habit, roundish, not acuminate leaves, congested inflorescences, small though obvious petals, and three stamens. Anthers dehiscing, and stigmas maturing when or before the flowers opened, the flowers often being cleistogamous in dull weather. Partially fertile: about 5 p.c. of the pollen appearing normal, and capsules containing a single seed often produced. Seeds interesting in having a mixture of the low rounded tubercles of *S. media* and the acute conical tubercles of *S. neglecta*.

S. (*pallida* × *neglecta*) × (*pallida* × *media*) F_2. Indistinguishable from the F_1.

S. (*pallida* × *media*) × *neglecta*. Showed the influence of *S. neglecta* in its markedly acuminate leaves and bracts, lax inflorescences, long pedicels, rather large flowers, and late-maturing stigmas. Stamens 6-9, with small, bright red, tardily dehiscent (sometimes indehiscent) anthers. Pollen wholly imperfect. Capsules never developed, even in back-crossed flowers.—P. M. BENOIT.

A NEW HYBRID GRASS*

A plant of an evident hybrid between *Catapodium marinum* and *C. rigidum*, discovered at Aberdovey, Merioneth, on 31st May 1960, was exhibited together with specimens of the parent species for comparison.—P. M. BENOIT.

GENTIANELLA CAMPESTRIS FROM DORSET

Specimens were exhibited from *Gentianella campestris* from Dorset, together with a map of its recorded distribution in the county. *G. campestris* is a decreasing species in Southern England. It is absent from Cornwall, and has been erroneously recorded from Somerset. In Devon it occurs on Dartmoor and Exmoor, and is rare and local in Dorset, Hants, Wilts., and Berks. The few scattered records for Dorset do not appear to have been confirmed recently, so it was a pleasure to record a flourishing colony from Winfrith Heath, a new locality.

The plant appears to grow in a wide range of different soils. In Scotland I have always associated it with base-rich pastures on the lower slopes of hills, and Martin and Fraser, *Flora of Devon* (1939), record it for cool, moist pastures on the Devon granite. On the other hand, previous records for Dorset have all been from localities on chalk or limestone and Townsend, *Flora of Hampshire* (1883), gives its habitat as dry chalky hills in Hants. The present station is from short turf bordering a track on a sandy heath, where the plant is associated with *Spiranthes spiralis*, and a number of ephemeral plants, including *Trifolium striatum*, *Aira praecox* and *Crassula tillaea*.—H. J. M. BOWEN.

LAMIUM ALBUM IN WALES

A map was exhibited showing the detailed distribution of *Lamium album* in Wales and the Welsh Marches. Common along the English border it rapidly becomes rare and scattered as it extends up the valleys into Wales, where it rarely exceeds 800 ft. altitude. In the lowland areas west of the mountains the plant occurs only in a few isolated localities.

Analysis of habitats showed association with railway goods yards and stations, village roadsides, farms and gardens: all with a close dependence on human activity, presumably for both survival and dispersion.

Small maps were shown of range of soil pH, and of occurrence of old records. In some places the plant has been known for nearly 100 years, in others it is of recent introduction.—Miss A. P. CONOLLY.

AN ENTIRE-LEAVED FORM OF *LAMIUM ALBUM*

Specimens were exhibited of an entire-leaved form of *Lamium album* from Essex.—Miss A. P. CONOLLY & Mrs. B. H. S. RUSSELL.

FLORA OF HUNTINGDONSHIRE

Plans were announced of three separate projects on the flora of Huntingdonshire, viz.: a popular survey for the forthcoming "Natural

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*See Plant Notes.—ED.

History of Huntingdonshire", the "Flora" itself and more detailed information on the distribution of species in the *Annual Reports of the Huntingdonshire Fauna and Flora Society*.

The exhibit was illustrated by maps showing the seemingly disjunct distribution of some species due to insufficient recording.—J. L. GILBERT.

A COMPARISON OF THE FLORAS OF EASTERN ENGLAND AND DENMARK

This exhibit was intended to show some of the different floral elements that might be encountered on the Society's proposed visit to Denmark (Summer, 1961).*

The following specimens were exhibited:—

Epipactis confusa—showing a predominantly Scandinavian distribution.

Draba incana—a northern central species of Europe and Asia, extending to Britain and Iceland.

Cirsium oleraceum—a common Continental species absent from Britain.

Pyrola chlorantha, Geranium palustre and *Ranunculus nemorosus*—central and eastern European species just reaching Denmark at its western limit.

Cicendia filiformis and *Carex trinervis*—Atlantic species just reaching the west coast of Denmark.

Carex caespitosa—common in Denmark but absent from Britain.

C. elata—a close relative of *C. caespitosa* that is found in both countries.

Lycopodium alpinum—not found in Denmark.

L. complanatum—a lowland wood counterpart of *L. alpinum*.—D. GLANVILLE, P. F. HUNT, A. C. JERMY and C. C. TOWNSEND.

FLORA OF A CITY PARISH

This exhibit showed the results of a year's work on the flora of St. Peter's Parish, Harborne, Birmingham. It forms part of a larger study of the three parishes of St. Peter's, St. Faith's and St. John's. 278 species were recorded in 1959. A further 25 were added in 1960.

The exhibit consisted of maps, photographs, an account of the only remaining orchid (*Epipactis helleborine*), and lists of species to be found in various habitats, together with specimens of some of the more interesting species still to be seen in the parish.—Miss C. M. GOODMAN.

ONONIS REPENS and *O. SPINOSA*

Studies on *Ononis repens* from dunes in Ireland, Lincolnshire and Norfolk suggest that there is a distinct dune form of this species, differing from the typical form in leaf index and in the much larger seed. Histograms for leaf index (length/breadth of terminal leaflet) lie in the zone intermediate between typical *O. repens* and *O. spinosa*. In stem pubescence, fruit index and other characters these dune plants conform to the *O. repens* condition.

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*It was unfortunately necessary to cancel this visit.—ED.

Observations on *Ononis* in East Anglia have confirmed several of J. K. Morton's conclusions (1956, *Watsonia*, **3**, 307-316).—J. Harding.

Three interesting Orchids

Perhaps the only specimen of *Gymnadenia odoratissima* (L.) Rich. ever found in Britain was displayed, with *G. conopsea* (L.) R. Br. and *G. conopsea* var. *densiflora* (Wahlb.) Lindl., which are sometimes mistaken for it. *G. odoratissima* is a Central European plant, and specimens from the Continent were shown.

Dactylorchis purpurella (T. & T. A. Steph.) Vermeul., found in S. Hampshire in 1955, is an esentially northern and western species. It has never before been found south of a line from the Wash to the Bristol Channel.

× *Orchiplantanthera somersetensis* Camus, has been recorded only once in Britain. There is some doubt as to its being a hybrid, but if it is, the most likely parentage is *Dactylorchis fuchsii* (Druce) Vermeul. × *Platanthera chlorantha* (Custer) Reichb.—P. F. Hunt and J. K. Bowden.

The Swiss-Italian Meeting

Coloured transparencies and specimens of plants seen on the Junior Field Meeting held in Switzerland and Italy in July 1960 were shown. —Junior Activities Committee.

POLYSTICHUM BRAUNII and Hybrids

—Professor I. Manton.

Vegetative Distinction of *CAREX FLACCA* from *C. PANICEA*

The exhibit showed a method for distinguishing vegetative shoots of *Carex panicea* from those of *C. flacca* in the field. The characters found most useful were the colour of the sheath, which is buff in *C. panicea* and red-brown in *C. flacca*, and the number of veins, counted in the longest leaf below the ligule. In *C. panicea* the veins are widely spaced, and number about 12 per leaf; in *C. flacca* they are closer together, and number about 17 per leaf. These characters are quite distinctive in the field.—Miss S. Megaw and D. Welch.

The Breconshire *HIERACIUM* Flora

For its geographical position, Breconshire has a remarkably large number of species of *Hieracium*. Although plentiful in only one or two localities, over 50 species have been recorded from the county. Many of these have very restricted distributions, about 10 being confined (or nearly so) to v.c. 42.

Herbarium specimens of some of the most characteristic species were exhibited.—B. A. Miles.

Progress of the Distribution Maps Scheme

A map of the distribution of records so far received showed that only 7 of the 3,500 10 km. squares in the British Isles had not been visited and that only about 100 had less than 150 records.

Maps of some common species were exhibited to show how complete the cover for these had been. It is likely that only about a dozen species do occur in every square in the British Isles. The list includes *Ranunculus acris*, *R. repens*, *Trifolium repens*, *Prunella vulgaris*, *Cirsium vulgare*, *Plantago lanceolata*, *Festuca rubra* and *Holcus lanatus*. Most of the 'common' species of England the absent from the far west of the British Islands and the Scottish Highlands.

Details of the 'Atlas' to be published early in 1962 were also displayed.—F. H. PERRING.

DISTRIBUTION OF SOME CRITICAL PLANTS

A number of maps were exhibited to demonstrate some of the difficulties in preparing maps of widespread critical pairs for the 'Atlas', e.g. *Rorippa nasturtium-aquaticum* and *R. microphylla*, *Aphanes arvensis* and *A. microcarpa*. Individual 'blind-spots' showed up clearly, and the maps therefore tended to plot the knowledge of recorders as much as the distribution of the species. *Dryopteris filix-mas* s.s. showed large gaps in the Midlands, Wales and S.-E. England merely because the aggregate alone had been printed on the master cards for those areas and recorders had omitted to 'write in' the segregate.

The response to requests for information on particular species in 1960 had been quite satisfactory and maps of the three varieties of *Raphanus raphanistrum* and *Allium vineale* both showed significant distribution patterns. The most successful project, however, has been the study of *Ranunculus ficaria*.

From the records it is clear that subsp. *ficaria* is the more widespread of the two common taxa. It has been found in all parts of the British Isles in which it has been looked for. Subsp. *bulbifer*, however, seems to be rare or absent in the far west, e.g. west coast of Scotland, Wales and Cornwall, and it is not common in N. Ireland. If it is more 'continental' than subsp. *ficaria* in Britain, this is understandable as subsp. *bulbifer* is the common, if not the only, form found in Sweden.

Subsp. *ficariaeformis* has only been recorded with certainty in a natural habitat in Jersey and the Scillies but should be looked for in S. England. It is common in the Mediterranean region.—F. H. PERRING.

FACTOR ANALYSIS AND THE TAXONOMIC DIVISION OF BRITISH PANSIES

—A. PETTET.

CHAROPHYTES FROM HICKLING BROAD

Herbarium specimens and spirit material of species of Charophytes from Hickling Broad were exhibited.

Hickling Broad, an area rich in species of this group, was visited by the B.S.B.I. in June 1960, and a map showed the areas from which plants were collected. A typical habitat was illustrated by a photograph. The characteristics of British genera of Charophytes, viz.:—*Chara*, *Nitellopsis*, *Lamprothamnion*, *Nitella* and *Tolypella* were demonstrated by means of diagrams and microscope slides.

Chara hispida L., a species found in Hickling Broad, was used as the example to illustrate the main features of Charophyte morphology, and other species used as examples were *Chara aspera* Willd., *C. aculeolata* Kütz., *C. canescens* Lois. and *Nitellopsis obtusa* J. Groves.—Mrs. S. P. Phillips.

TUBERARIA GUTTATA IN BRITAIN

—M. C. F. Proctor.

ECOLOGICAL SIGNIFICANCE OF HYBRIDISATION BETWEEN *RUMEX SANGUINEUS* AND *R. CONGLOMERATUS*

The exhibit consisted of plans of two transects made in marshes where *Rumex sanguineus* and *R. conglomeratus* occurred together. In each case, there was a variation in level from one end of the transect to the other, and in one case there was in addition a variation in density of shade. The transects were intended to demonstrate possible ecological relations between the two species. In both transects some plants were found which appeared, on a basis of hybrid index, to be intermediate between the two species. Such individuals had been supposed previously to be hybrids. They were associated with the regions where the ecological ranges of the two species overlapped.—O. Rackham.

FLORA OF THE SOMME VALLEY AND PAS DE CALAIS

Careful study of the distribution of species of "Continental" and "Atlantic" types in the north of France reveals that the flora of the coastal regions of the Pas de Calais, and indeed much of northern France north of the Somme valley, has a flora markedly lacking in "Continental" elements. Many of the species which occur plentifully on the chalk hills of south-east England are very rare, or unrecorded, in the Pas de Calais. In the Somme valley above Amiens, however, a rich "Continental" flora begins to appear as one goes inland, with several non-British elements present.

The "Atlantic" element in the flora of northern France, on the other hand, is concentrated on (1) the coastal dunes, (2) on the acid soils of the Bas de Boulonnais and about St. Omer, but, probably owing to the limited extent of such acid soils, this element is limited in development compared with its richness in south-east England.

The causes of these phenomena would, however, appear to be in the main, climatic.

Specimens of these elements were exhibited.—F. Rose.

FESTUCA ALTISSIMA IN SUSSEX

In the *Flora of Sussex* (Wolley-Dod, 1937) it is stated that this species is probably extinct in Sussex. The species is there recorded for Hamsell Forge Rocks (=Harrison's Rocks) in 1818 (Herb. Borrer); and again in 1852 by F. Townsend. It is also reported from Fairlight Cliffs by E. N. Bloomfield, but this may be an error, as the habitat is not very likely for this species. The species has not been seen again in these localities, in spite of search.

However, it was rediscovered at Mill's Rocks, East Grinstead, v.c. 14, by D. Streeter and myself in 1955. It exists here in abundance over a small area in oakwood in a shady ravine on sandstone rocks, associated with *Dryopteris aemula* (*S.E. Nat.*, **1957**, p. xvii). This record appears to have been the only one for that part of England south of the Pennines and east of the Wye Valley area for over a hundred years.

It is now possible to report a second modern locality in the High Weald of Sussex. Two plants of this species were found in August 1960, in Dallington Forest, v.c. 14. The plant occurs here on a cliff of Ashdown Sand under the shade of large trees of *Fagus sylvatica*, in a sheltered ravine or "gill", above a stream.

Species occurring within a few metres of *F. altissima* on the same cliff include the highly "Atlantic" fern *Dryopteris aemula*, and the equally "Atlantic" hepatic *Saccogyna viticulosa*. By the stream below *Sibthorpia europaea* is plentiful.

We have here, therefore, a remarkable assemblage of species requiring a moist humid atmosphere and shelter from trees: possibly *Festuca altissima* in the Weald is a relic, with these other species, of the primaeval mixed oak forest flora of the "Atlantic Optimum".—F. Rose.

ASTRANTIA MAJOR IN SHROPSHIRE

The activities of local botanists in Shropshire in recent years have revealed that *Astrantia major* is not confined to the Stokesay Castle area, but occurs in several remote wooded ravines in the west of the county.

I was taken to one of these localities, on the slopes of the Long Mountain near Brocton, by Mr. Charles Sinker in September 1960. The species occurs scattered for some distance along the floor of a ravine on basic Ordovician Shales in natural-looking woodland of *Fraxinus* and *Ulmus glabra*, in heavy shade.

The soil is that of a miniature alluvial terrace by the stream, and *Astrantia* is associated with *Mercurialis perennis*, *Asperula odorata*, and *Sanicula europaea*. No houses occur within ¼ mile of the locality, which appears completely natural. The association in which *Astrantia* is present here is very similar to that in many habitats in central Europe, for this species.

It seems at least possible that it is a native relic species in Britain, which has disappeared from intermediate localities. Its pollen should be sought in Post-Glacial deposits, and its present distribution in the Welsh Marches should certainly be investigated more fully, as many suitable habitats occur in this region.—F. Rose.

ERIGERON ANNUUS IN BERKSHIRE

Specimens of *Erigeron annuus* collected near Reading, Berkshire, were exhibited.—Mrs. A. M. Simmonds.

BROAD-LEAVED FORMS OF *MELAMPYRUM PRATENSE*

—A. J. E. Smith.

THE WICKEN FEN POPULATION OF *DACTYLORCHIS INCARNATA*

The complex floral variation of *Dactylorchis incarnata* was investigated in the Wicken Fen population. A sample was studied and the following points established.

(1) Even within a single inflorescence there was a considerable range of labellum shape.

(2) A correlation (v=0·76) existed between intensity of population and shape of the labellum.

(3) The presence of the subspecies *gemmana* and *pulchella* was confirmed.

The exhibit consisted of herbarium specimens and diagrams.—G. **SMITH.**

CALYSTEGIA SEPIUM, *C. SILVATICA* AND THEIR HYBRID

Results of work carried out on white-flowered *Calystegia* were briefly summarised. All three taxa are (probably 100%) self-incompatible, but may be crossed artificially in all combinations, both intra- and inter-specifically, with a large measure of success. Results were presented for such pollinations.

A compound hybrid index was constructed using four independently variable characters, by means of which each colony could be characterised by a single number. Results of such numerical colony characterisations were shown on two block graphs from different areas of Kent, one where the two species were present without intermediates, the other where numerous hybrids and their (fertile) backcrosses were present, as shown by the graphs. Herbarium specimens of both species and their hybrid were exhibited, together with tables assessing the relative values of characters variously used in speciation. The hybrid should be known as *C.* × *lucana* (Tenore) G. Don: it is very widespread in the Mediterranean area, and probably common throughout England and Wales.—C. A. **STACE.**

AN ALIEN *VERBENA* NEW TO BRITAIN

Herbarium specimens were shown of *Verbena menthaefolia* Benth., a native of North America closely allied to *V. officinalis* L. It has occurred in Britain as wool alien.

The following characters separate the two species:—*V. officinalis*: Stem somewhat glandular, *inflorescence axis usually considerably glandular* (*as are the fruits*). Leaves rather sparsely hairy and glandular below, rather more so beneath, on the surface as well as the nerves, twice as long as broad with broad, obtuse segments. *Flowers lilac, yellow-white at the throat, 4·5-5 mm. in diameter, tinted with reddish at the top of the tube outside.* Anthers yellow-green. Fruit 2 mm., 4-angled. *Bracts lanceolate-ovate, shortly acuminate, widest around the middle.*

V. menthaefolia: Stem almost glabrous below inflorescence, a very few *upwardly directed strigose hairs present, as on the inflorescence, and glands few or none.* Leaves shining, dark green above, very sparsely hairy, hairy only on the nerves beneath. *Flowers deepish violet, 6-6·5 mm. in diameter, little or not paler at the throat, deeper at the top of the tube outside.* Anthers yellow. Fruit 3 mm., 4-angled.

Bracts triangular-ovate, long-acuminate, broadest near the base. Leaves three times as long as broad, lobes rather tapering.—C. C. TOWNSEND.

POLYPODIUM VULGARE IN BRITAIN

The exhibit sought to present further evidence obtained from work done at Leeds University by Professor I. Manton and Miss M. G. Shivas for delimiting the segregates included in the *Polypodium vulgare* complex in the British Isles. Three cytotypes are involved, diploid (2*n*), tetraploid (4*n*), and hexaploid (6*n*), and cytological evidence, namely the behaviour of the chromosomes at meiosis in the hybrids (triploid; 2*n* × 4*n*: tetraploid; 2*n* × 6*n*: pentaploid; 4*n* × 6*n*) was shown to suggest that these should be accepted as *species.* The diploid was, in fact, recognised long ago and named *P. australe* Fée; the tetraploid is *P. vulgare* L. *sensu stricto;* and for the hitherto un-named hexaploid Dr. Shivas has proposed the epithet *interjectum.* Further details of this work including a description of this latter new species have been published elsewhere* by Dr. Shivas and an abstract of this will be submitted to *Proceedings.*

The exhibit illustrated differences between these species and these are best summarised in the key below. Distribution maps were displayed, one of the aggregate (B.S.B.I. Distribution Map) showing a scarcity of the complex in the Midlands and Fens, the other of the three segregates (from recently determined material) showing a general scatter of the *P. vulgare* s.s. and *P. interjectum* but indicating *P. australe* as being confined to W. Ireland and S.W. England.

KEY TO *POLYPODIUM VULGARE* AGG.

1. Number of *indurated cells* in the annulus usually *10-14; fronds linear-lanceolate* (more than half the pinnae ± equal length), coriaceous, *basal pair of pinnae not inflexed; sori circular in outline.* New fronds produced in early summer, spores ripening July-August; paraphyses absent............... *P. vulgare* s.s.
Tetraploid

Number of *indurated cells less than 10; fronds ovate or triangular, basal pair of pinnae* usually *inflexed;* at least some of the *sori oval in outline* 2

2. Number of *indurated cells in annulus usually 4-7; paraphyses present* amongst sporangia: *fronds broadly ovate to triangular* (longest pinnae 2nd pair from base), *not coriaceous,* basal pinnae often inflexed. New fronds produced in autumn, spores ripening in late autumn or in following spring ... *P. australe*
Diploid

Number of *indurated cells* usually *8 or 9; paraphyses absent; fronds ovate to ovate-lanceolate* (longest pinnae 4th-6th pair from base), *coriaceous,* basal pinnae inflexed. New fronds produced in summer, spores ripening July-December .... *P. interjectum*
Hexaploid

—Mrs. T. G. WALKER (M. G. SHIVAS), J. A. CRABBE and A. C. JERMY.

SCOTTISH ALIENS

Herbarium specimens were shown of some alien grasses, etc., introduced with Esparto grass (*Stipa tenacissima* L.) from North Africa, and found growing on a tip at the Chirnside Paper Mill, Berwick.—Miss M. McCALLUM WEBSTER.

J. Linn. Soc., Bot.,* **58, 29 (1961).

REPORT OF THE COUNCIL FOR 1960

The report and the audited accounts cover the period from 1st January to 31st December 1960. Comparative figures for 1959 are given in brackets unless otherwise indicated.

During the year 93 (110) new members joined the Society and we lost 65 (158) by reason of death, resignation and the operation of Rule 29. The total membership at the end of the year was 1280 (1252) with a net gain of 28 (loss of 48). We record with great regret the death of the Rt. Hon. H. T. Baker, an Honorary member and President of the Society from 1932 until 1947. His passing severs one of the few remaining links with George Claridge Druce. We also lost by death two long-standing and valued members in F. T. Hall and E. Marsden-Jones.

The year witnessed the first stage of a new development in the affairs of the Society in the election of two regional representatives to the Council. We hope that this will be followed during the coming three years by representation from all of the Regions.

After making provision for two parts each of both *Proceedings* and *Watsonia*, we are left with a surplus of £310, which has been added to the General Fund. Subscriptions have been well maintained. The excellent sales of our periodicals reported for 1959 have been exceeded in 1960; this important source of revenue, which now covers quite a significant proportion of the total cost of printing the periodical publications, is a gratifying reflection of the status which the Society and its published works hold amongst libraries, institutions and learned bodies throughout the world.

Expenditure on printing in 1960 has been unusually high by reason of the need to reprint the Prospectus and Rules and because of several other smaller items, which do not recur each year.

Transactions on the Publication Fund have been restricted to receiving the proceeds of the sale of past publications and the incurring of minor expenses. The future burdens which this Fund will have to bear have been lightened by the agreement with Thomas Nelson & Sons to take over responsibility for the publication of the 'Atlas'.

The Society has been notified of a legacy amounting to £100 from the estate of the late Rt. Hon. H. T. Baker. This is expected to be received in 1961.

It has been a year of considerable importance for the Distribution Maps Scheme, the progress of which is the subject of a separate report by the Director. The **Maps Committee** (Secretary, Professor A. R. Clapham) has been mainly occupied with negotiations concerning the publication of the much-awaited 'Atlas'. We record again our gratitude to the Nature Conservancy for meeting the cost of the Scheme in its second phase and to Cambridge University for providing accommodation for the staff and equipment.

The **Publications Committee** (Secretary, P. J. Wanstall) has had a full year in which two parts of *Proceedings* and one part of *Watsonia* were published. A report, edited by P. J. Wanstall, of the Darwinian

Conference, held in 1959, will soon be ready for publication. We welcome the publication by our member, N. D. Simpson, of the *Bibliographical Index of the British Flora*, which we had sponsored. There was again a good sale for our journals and once more we express our thanks to E. B. Bangerter for handling so well this very important service and also to the Trustees of the British Museum (Natural History) for continuing to allow the storage of our publications at the Museum. We thank also those members who have presented us with old parts of our periodical publications and so have helped us to replenish our diminishing stocks.

The **Development and Rules Committee** (Secretary, A. C. Jermy) has been mainly occupied with the setting in motion of the procedures necessary to establish the regional organisation in accordance with the new Rules adopted at the last Annual General Meeting. The appointment of the District Secretaries and the revision of the List of Recorders have made good progress. The Committee has also given attention to the need for a new Prospectus.

A full programme of meetings was arranged by the **Meetings Committee** (Secretary, H. J. M. Bowen). Before the Annual General Meeting lectures were given by Dr. Francis Rose and Mr. J. E. S. Souster, and after the meeting a number of members visited the Royal Botanic Gardens, Kew. On the following day, 25 members were conducted on a tour of the National Pinetum at Bedgebury, in Kent, and we thank the Forester in Charge, Mr. A. Westall, and others who made this a memorable day.

A successful Regional Meeting, organised by Dr. A. J. Willis, was held in September at Bristol. A full programme, consisting of lectures and an exhibition meeting, was followed by a visit to Brean Down and Berrow Marsh. We thank, firstly, Professor Yemm for the hospitality provided and, secondly, all others who contributed to a very enjoyable week-end.

The Annual Exhibition Meeting was held at the Chelsea College of Science and Technology, by kind permission of the Governors. There were 31 exhibits compared with 21 last year, but the number was well below the average of recent years. Conversaziones held after the Annual General and Exhibition Meetings were less well attended than they have been in the past.

Field meetings, arranged by the Field Secretary (P. C. Hall), attracted a total attendance of 144 (210), the attendance at each meeting is shown in brackets: Ripley, for the study of willows (30); Weymouth (29); Hickling Broad (14); Stamford (30); Isle of Man (6); Nuneaton (15); Barnard Castle (20).

The **Junior Activities Committee** (Secretary, Margaret E. Bradshaw) organised two residential meetings and eight day meetings for botanists still at school. The fourth meeting abroad, organised by Dr. Bradshaw and led by Professor F. Chodat of Geneva University, was held in the Swiss and Italian Alps. Seventeen attended this exceedingly good course on Alpine plants and their ecology and we are indebted to Professor Chodat and his assistants for all they did to make this meeting such a success. The other residential meeting was cancelled because of lack of support. One-day meetings, with attendances shown in brackets, were held at Ripon (12), Tring (17), Cefn (27), Randon Wood (25), Runnymede (40), New Forest (14). Cunswick Tarn (2). A visit to Down House in January attracted an attendance of 90, mainly from London schools. We thank all leaders and other helpers who assisted with this worthwhile work of helping younger botanists.

The **Conservation Committee** (Secretary, C. D. Pigott) reports with much pleasure the establishment of several new National Nature Reserves of considerable botanical importance. Two meetings of the Committee with representatives of the Nature Conservancy have allowed profitable discussions on many matters and the opportunity to discuss management plans of existing reserves. The Committee has also been able to assist in the revision of the list of sites of scientific interest but has expressed its strong feeling that the protection granted to these sites is not always adequate to maintain their value.

The Public Inquiry held at Brixham in 1959, at which the Society was represented, resulted in the rejection of an application for permission to extend quarrying at Berry Head.

The Committee sent in a memorandum to the Ministry of Agriculture Research Study Group on the use of toxic chemicals in agriculture. Dr. Pigott discussed this memorandum with the Committee in December.

The **Committee for the Study of the Scottish Flora** (Secretary, B. W. Ribbons) organised a full programme of meetings. Exhibition meetings were held in Queen's College, Dundee, which was attended by about 100 persons and at the Academy, Elgin, attended by 40 persons; and at the University of Glasgow Botany Department, with an attendance of about 50. Field meetings, at which work was directed towards helping the preparation of local floras and the Distribution Maps Scheme, were held at Elgin (10), St Cyrus (5), Duns (20), in the Shetland Isles (9), and at the Field Studies Centre at Garth (11). Attendances at these meetings are shown in brackets. A second meeting at Garth, the annual cryptogamic foray, was attended by five members. A meeting planned to take place at Loch Eil was cancelled through lack of support.

During the year the Committee has considered the changes in the Society's Rules so far as they affect Scotland and, in particular, the difficulty of attending Council meetings in London by Scottish members was discussed. The Committee has noted with pleasure that the botanical content of the B.B.C.'s Scottish Programme appears to be increasing.

A fuller account of the work of the Committee will appear in **Proceedings,** Vol. 4, Part 3.

The Council again thanks the many members and friends who have helped the Society in various ways to continue its useful work.

T. G. Tutin, President.
J. G. Dony, Secretary.

By Order of the Council,
February 16th, 1961.

GENERAL INCOME AND EXPENDITURE ACCOUNT

for the year ended 31st December 1960

9			
	Cost of printing and distributing:		
	(1) *Proceedings*,		
	Vol. IV Part 1	£395 0 6	
	Vol. IV Part 2 (provision) ...	350 0 0	
	(ii) *Watsonia*,		
	Vol. IV Part 5	367 10 1	
	Vol. IV Part 6 (provision) ...	400 0 0	
,126			£1,512 10 7
50	Grant to Maps Scheme ...		50 0 0
.114	Printing Notices of Meetings		119 19 3
79	Expenses of Council and Committee Meetings ...		52 10 1
109	General printing, stationery, postages, telephone and petty expenses		177 18 2
3	Field and Exhibition Meetings expenses, less fees received		6 1 8
750	Transfer to Publications Fund		—
29	Excess of income over expenditure credited to General Fund		309 16 8
.260			£2,228 16 5

1959			
£1.799	Subscriptions received ...		£1,794 18 3
103	Interest received		153 17 0
	Proceeds from sales:		
	Proceedings ...	£80 10 4	
	Watsonia ...	192 13 8	
	Old Reports ...	6 17 2	
278			280 1 2
80	Grant from Ghana Government towards cost of Supplement to *Proceedings*		—
£2,260			£2,228 16 5

PUBLICATIONS FUND

Transactions in 1960

9		
£3	Cost of printing and/or binding	—
6	Prospectuses and publicity	£6 10 0
787	Balance to 1961	1,887 9 2
796		£1,893 19 2

1959		
£685	Balance from 1959	£1,787 8 7
100	Grant from Royal Society towards cost of *British Herbaria*	—
	Sales:	
7	*Flora of Jersey*	4 8 8
24	*British Herbaria*	11 8 10
158	*List of British Vascular Plants* (Half share) ...	25 16 6
58	Conference Reports ...	49 15 4
14	Other Publications ...	15 1 3
750	Transfer from General Income and Expenditure Account	—
£1,796		£1,893 19 2

BALANCE SHEET as at 31st December 1960

1959		£	s.	d.
	General Fund:			
	Balance 1st January 1960 ...	£1,070	13	8
	Add: Excess of income over expenditure for year	309	16	8
£1,071		1,380	10	4
1,787	Publications Fund	1,887	9	2
40	Benevolent Fund	39	11	0
369	Creditors for Printing and General Expenses	750	0	0
107	Subscriptions received in advance	105	1	0
£3,374		£4,162	11	6

1959		£	s.	d.	£	s.	d.
	Investments:						
	4½% Defence Bonds	£500	0	0			
	5% Defence Bonds	1,000	0	0			
£1,500					£1,500	0	
	Cash at Bank:						
	Deposit Account	£2,350	0	0			
	Current Account	312	11	6			
1,874					2,662	11	
£3,374					£4,162	11	

J. C. GARDINER, Hon. Treasurer.

Examined and found correct.
January 31st, 1961.

J. H. G. PETERKEN, Hon. Auditor.

DISTRIBUTION MAPS SCHEME

SEVENTH ANNUAL REPORT TO 31st DECEMBER 1960

As in 1959, the main task of the Maps Scheme has been the preparation of material for the publication of the Atlas. In April we were approached by Thomas Nelson & Sons, who offered to publish the Atlas as a joint venture in co-operation with the Botanical Society of the British Isles and to pay the Society a royalty on each copy sold. After careful consideration it was agreed to accept this offer as it will relieve the society of all financial responsibility and will mean that the Atlas will have the widest possible circulation. The Atlas will be printed by Jarrold's of Norwich, whose work is already familiar to members as the printers of the recent *List of British Vascular Plants*, by J. E. Dandy.

A production time-table has been drawn up, which will ensure that the Atlas will be published in February 1962. The first half of the work is now complete and was in the hands of the printers before the year ended.

New records have continued to flow in during the year and are still welcome. Unfortunately, it will not be possible to include all these on the maps to be published in 1962, but new data are being dealt with in rotation and will be available for revised maps when these are required.

Further records of critical genera were accumulated and the meeting held in Berwickshire made a useful contribution, collecting a great deal of herbarium material. The annual appeal for information about certain species was again successful and we intend to continue with these appeals in the future. Preparation of maps for the volume of critical species will commence in the autumn of 1961, so a special effort to provide data and records will be made in the annual appeals.

The scheme continues to arouse interest not only in this country but also abroad, and there is a constant demand for copies of the maps. Recently we have received enquiries about the organisation and planning from workers interested in biological recording in Australia, New Zealand, Michigan, California and Alaska.

The office staff has been kept extremely busy and my sincere thanks go to Miss Nicholson and Mrs. Fincham, who continue to deal with correspondence and records with calm cheerfulness.

F. H. PERRING.

DISTRIBUTION ATLAS ACCOUNT

For the Year Ended 31st December 1960

1959			
	To Balance from 1959 :		
	Current Account	£369 9 10	
	Deposit Account	500 0 0	
£502			£869 9 10
500	,, Repayment of Defence Bonds		—
2,805	,, Grant from Nature Conservancy		3,135 0 0
50	,, Grant from B.S.B.I. ...		50 0 0
27	,, Interest received		28 14 10
6	,, Sales of Record Cards and Maps		25 18 3
75	,, Copyright Fee		—
£3,965			£4,109 2 11

1959			
£58	By Furniture and Office Equipment		£2 18
	,, Mechanisation Equipment :		
	Rental Charges and Maintenance	£532 1 0	
	Stationery ...	71 9 7	
575			603 10
64	,, Postages and Telephones		63 16
86	,, Printing and Stationery		91 13
58	,, Rent, Rates, Heating and Lighting		—
2,150	,, Salaries, Wages and Clerical Assistance ...		2,477 19
	,, Travelling Expenses :		
	Staff	£39 12 2	
	Others ...	10 0 0	
86			49 12
9	,, Insurance		15 10
3	,, Repairs		17
7	,, Other Expenses ...		14 13
	,, Balance to 1961 (being total funds in hand) :		
	Current A/c.	£288 10 3	
	Deposit A/c.	500 0 0	
869			788 10
£3,965			£4,109 2 1

J C. GARDINER, Hon. Treasurer.

Examined and found correct.
January 31st, 1961.

J. H. G. PETERKEN, Hon. Auditor.

COMMITTEE FOR THE STUDY OF THE SCOTTISH FLORA

SIXTH ANNUAL REPORT TO 31st DECEMBER 1960

The Committee has met three times (at Glasgow in March and November and at Edinburgh in October), has held three Exhibition Meetings (at Queen's College, Dundee, by permission of Dr. Edith Smith, on 19 March, at the Academy, Elgin, by permission of the Rector, on 20 March, and at the University of Glasgow Department of Botany, by permission of Professor J. Walton, on 12 November); and six Field Meetings (at Elgin, 10-13 June, led by Mr. J. G. Roger; at Garth Field Studies Centre, Perthshire, 17-19 June, led by Dr. D. Ratcliffe; at St. Cyrus, 8-11 July, led by Dr. C. H. Gimingham; at Duns, 30 July-6 August, led by Dr. F. H. Perring; in the Shetland Isles, 6-20 August, led by Mr. R. Palmer and the Chairman; and at Garth Field Centre (Cryptogamic Foray), 17-19 September, led by Mr. D. M. Henderson). The Committee also made arrangements for the first meeting of the members of B.S.B.I. normally resident in Scotland, in Glasgow, on 12 November, at which Dr. Denis Ratcliffe was elected to serve on the B.S.B.I. Council.

At the field meetings, work was directed towards helping the preparation of local floras, the Distribution Maps Scheme, and those beginning field botany. Ten members and friends attended at Elgin, 11 at Garth in June, 5 at St. Cyrus, 20 at Duns, 9 at Shetland, and 5 at the Cryptogamic Foray. A proposed meeting at Loch Eil, having attracted only two bookings, was cancelled. Reports of these Meetings will appear in the *Proceedings of the B.S.B.I.* (Vol. 4, part 4).

The Exhibition Meeting at Dundee was attended by about 100 persons. Mr. J. Grant Roger presided in the absence of the Chairman and spoke briefly about the Committee, the Distribution Maps Scheme and the two Societies. Dr. D. A. Robertson of the Department of Botany, Queen's College, lectured on "The Flora of Angus" and showed many coloured illustrations. He selected for contrast one area on each side of the Great or Highland Boundary Fault which divides the county: viz., in the south, the coast at Arbroath, a cultivated area of fertile soil on the Old Red Sandstone, and in the north, Glen Clova, a Highland region of heather and 'sedge' lying on much older rocks.

The B.S.B.I. official exhibit was displayed together with the following exhibits: *Scottish Willows (Miss U. K. Duncan); *Wool adventives grown at Forres, Morayshire, in 1958 (Miss M. McC. Webster)—seeds obtained from one lb. of combings from fleeces of Australian sheep from a wool mill in Devon produced plants, nearly all of which set seed. None persisted the following year; interesting plants from Tentsmuir (E. Cropper); *wild flower studies, paintings and drawings (L. Fullerton); distribution of Blackberries in Britain and the Raspberry—wild in Britain (G. Haskell); chromosome instability in *Rubus* (N. N. Tun); a flowering specimen of *Pinguicula grandiflora* (D. A. Robertson); a technique for measuring structural features of plant epidermis using cellulose acetate films (C. North); cellulose destroying fungi; *paintings of flowers of the East Lothian coast (Miss Bessie Inglis); plants grown for the Dundee Horticultural Show (R. M. Robertson); residual herbicides (R. J. Stephens); tetraploid mutations in raspberry roots (D. L. Jennings); *Geum macrophyllum* from Kinnordy Loch and aliens from waste ground at Stannergate (H. G. Watson); Botany round the City of Dundee (Miss E. P. Smith); *three species of greater Bindweed (P. S. Green); effect of day length on the physiology of the strawberry (C. G. Gutteridge and P. A. Thomson); *plants from Switzerland having Scottish connections (R. Mackechnie); some common woodland fungi found locally (D. A. Robertson); *Carex flava*, and its allies and ecological variation in *Juncus bulbosus* (J. L. Colville); the genus *Luzula* in Britain (J. Robertson); and jute trade research (Miss M. Wilson).

The Chairman thanked all the exhibitors and helpers and especially Dr. Edith P. Smith and Dr. and Mrs. D. A. Robertson for their work in bringing about one of the most successful meetings the Committee had held.

In Elgin some 40 people attended and saw those exhibits marked* in the foregoing Dundee list together with a herbarium of local bryophytes shewn by Dr. K. Richter of Gordonstoun. Mr. J. Grant Roger gave an illustrated lecture on "The Flora of the Cairngorms". The Honorary Secretary presided, explained the work of the Committee and the sponsoring Societies, and expressed thanks to the Rector of the Academy and to Mr. Kenneth Wood, Tutor in Extra-Mural Studies at the University of Aberdeen.

In Glasgow the attendance was about 50 and the Chairman presided at the meeting. The following shewed colour transparencies of field meetings held during the year: Mr. B. W. Ribbons (Culbin Sands, spoken to by Mr. R. Mackechnie; Loch Loch, spoken to by Dr. D. Ratcliffe; Shetland, spoken to by Mrs. F. M. Elder and Mr. R. Mackechnie); Dr. Denis Ratcliffe (Loch Loch, Cairn Gorm and Glen Lyon); Dr. F. H. Perring (Dulaw Dene, Berwickshire, spoken to by Mr. R. Mackechnie). Mr. A. McG. Stirling also showed slides taken at Kishorn, Wester Ross and the Mull of Galloway. The following exhibits were shewn: plants from Shetland (R. C. Palmer); a new method of preservation and presentation of British mosses (the Curator, Glasgow Botanic Gardens); some *Equiseta* and two rare species of *Potamogeton* (Miss U. K. Duncan); diet studies of hill sheep (D. J. Martin); Scottish plants in new stations—6 phanerogams, and 2 bryophytes with accompanying descriptions and maps (H. Milne-Redhead); West Ross plants, including new county records (A. Slack & A. McG. Stirling); Culbin plants (J. G. Roger & B. W. Ribbons); Perthshire plants (D. Ratcliffe & B. W. Ribbons); new records from the Isle of Foula (Miss S. C. Holbourn, per P. S. Green); plants from the Isle of Colonsay (E. Todd); *Pyrola chlorantha*—a Scottish species? (B. L. Burtt); Shetland plants (Mrs. F. M. Elder, R. Mackechnie and B. W. Ribbons); Berwickshire plants (F. H. Perring); wool, grain, and esparto grass aliens (Miss E. P. Beattie); *Carex* species from North Swedish Lappland (J. H. Dickson); together with the B.S.B.I. and B.S.E. official exhibits. The Chairman kindly acted as local organiser for this meeting.

Mr. R. Mackechnie was re-appointed Chairman, Mr. B. W. Ribbons Honorary Secretary, and Mrs. F. M. Elder Field Secretary. Dr. Denis Ratcliffe was co-opted and appointed Meetings Secretary.

The accounts shewed a deficit of £13 15s. 5d. for the year 1959, and this amount has been refunded by the two Societies.

During the year the Committee has considered the changes in the B.S.B.I. rules in so far as they affect Scotland and, in particular, the difficulty of attending Council Meetings in London by Scottish Members was discussed. At the request of the B.S.B.I. the list of Recorders for Scottish vice-counties was reviewed. The Committee also noted with pleasure that the Botanical content of the B.B.C.'s Scottish programme appeared to be increasing.

The Secretary once again has pleasure in expressing the Committee's thanks to the officers of the sponsoring societies, the leaders of the field meetings and the other members and friends who have taken part in the Committee's work during 1960.—B. W. Ribbons.

SUMMARY OF PAPER READ PRIOR TO THE ANNUAL GENERAL MEETING, 1961

Problems in pollination, dispersal and ecology in *PRIMULA*

S. R. J. Woodell

The three British species of *Primula* in the section *Vernales* are *P. veris* (the Cowslip), *P. elatior* (the Oxlip), and *P. vulgaris* (the Primrose). Hybrids between them can be produced artificially with varying success. In the wild, however, although F_1 hybrids between *P. veris* and *P. vulgaris* are frequent and between *P. vulgaris* and *P. elatior* are common, F_2 segregates and backcrosses are rare in the former and uncommon in the latter cross. This is in contrast with the situation in the experimental garden, where they can be produced with relative ease. What are the reasons for this?

At some stage or stages in the life history some barrier to backcrossing must be operating. Considering the life history in succession, we can try to pinpoint the important stages.

1. Pollination: the pollinators of these species are not certainly known, and more work needs to be done. They may be nocturnal moths, or pollen-eating beetles, or possible members of the genus *Bombylius*.
2. Fertilization and seed development: If pollination is successful these will normally take place. Much seed is lost, however, by rotting and mouse damage.
3. Germination: germination of hybrid seed is poor.
4. Seedling development: this may be the most important stage in the life history. Failure of hybrid and backcross seedlings to compete with those of the species would prevent their establishment in all but very disturbed conditions.
5. Adult plants: Competition may operate here to the detriment of the hybrids, though once established they appear to be able to maintain themselves.

Experimental work to test these views is in progress.

A second paper, entitled "A comparison of the Distributions of British Flowering Plants and Bryophytes", was read by Dr. E. F. Warburg. It is hoped to print this unabridged in a future number of *Proceedings*.

ANNUAL GENERAL MEETING, 15th APRIL 1961

The Annual General Meeting of members of the Society was held at the University Botany School, South Parks Road, Oxford, on Saturday, April 15, 1961, at 12 noon.

The President (Prof. T. G. Tutin) was in the Chair and 73 members were present.

The Minutes of the last Annual General Meeting, as printed in *Proceedings*, Vol. **4**, Part 1, pages 99-100, were adopted.

Council's Report. The Report of the Council for the year 1960 had been printed and circulated to all members. Emphasising a few points, the President mentioned that the visit to the Swiss and Italian Alps, organised by the Junior Activities Committee, had been highly successful. Dr. Margaret Bradshaw had resigned as Secretary of the Junior Activities Committee, as had Dr. C. D. Pigott, Secretary of the Conservation Committee, and Council was very grateful to both for their services on behalf of the Society. It was confidently expected that the Distribution Maps Scheme "Atlas of British Plants" will be published before the next A.G.M.

The President felt sure that members would like him to thank the General Secretary, the Treasurer and other officers.

The adoption of the Report and Accounts was carried unanimously.

Change of Rule. The President said that the small change of deleting 'and upon receiving a copy of the Rules' from Rule 24, which was suggested, would mean that a brochure could be printed without reprinting the Rules, and this would lead to appreciable financial saving. Its adoption was proposed by Dr. Warburg, seconded by Dr. Bowen, and carried.

Election of President. Prof. Tutin said that he retired under the terms of Rule 9, and Council had nominated Mr. J. E. Lousley. Of him, Prof. Tutin said he is outstanding, accurate and indefatigable, a member of the Society for 34 years who had served continuously for a quarter of a century on the Council. He became Treasurer in 1942 in tragic circumstances, when Francis Druce was killed in an air raid and many of the Society's records were destroyed. He was Treasurer until 1950 when he was persuaded to take over the more onerous office of Secretary. It has been reported that during the 14 years he held office, he missed one Committee and no Council meeting. This was a measure of his great devotion to the interests of the Society. Mr. Lousley was elected President with acclamation.

Mr. Lousley then took the Chair and said that he felt sure that all present would wish him first to thank Prof. Tutin for all that he has done to help the Society during his four years of office. As a genial and erudite President, he influenced our activities in many ways, but above all he widened our horizons, and for this we owed him a special debt.

When Prof. Tutin was elected in 1957, our outlook, as a Society, was almost limited to Britain. Now we took more interest in the behaviour of British species as they occur abroad. We have followed our President as he moved from the editorship of the *Flora of the British Isles* to that of the "Flora Europaea". Mr. Lousley hoped that this trend in the Society's outlook will continue.

The new President said he felt greatly honoured by his election, and would like to regard it as a tribute to the many amateur botanists who have worked so hard for the Society, rather than on account of any personal qualities. It was true that he had served on Council continuously since 1937, and had acted, in turn, as Treasurer, Secretary and Vice-President, and in any other city might be tempted to claim this as a record, but not in Oxford; for George Claridge Druce combined all these offices when he organised the Society here from 1903 to 1932. It was a special pleasure to hold our Annual General Meeting in the city which was the official address of the Society for nearly a quarter of its history.

ELECTION OF VICE-PRESIDENT, HONORARY OFFICERS: SECRETARY, TREASURER, TWO EDITORS, MEETINGS SECRETARY, FIELD SECRETARY, AND JUNIOR ACTIVITIES SECRETARY. Council had nominated Mr. J. E. Dandy, Dr. J. G. Dony, Mr. J. C. Gardiner, Dr. M. C. F. Proctor and Mr. D. H. Kent, Dr. H. J. M. Bowen, Mr. P. C. Hall and Mr. P. F. Hunt respectively, and they were elected unanimously with thanks for their past services.

ELECTION OF MEMBERS OF COUNCIL. Miss L. W. Frost, Miss C. M. Goodman, Mr. D. E. Allen and Mrs. B. H. S. Russell retired in accordance with the old Rules and, in accordance with the Rules adopted in 1960, three members were to be elected. A further vacancy arose from the election of Mr. Lousley as President. Six members had been nominated under Rule 10, and, after a ballot, Mr. T. G. Collett, Dr. J. G. Hawkes, Dr. S. M. Walters and Dr. S. R. J. Woodell were declared elected. The order of seniority for retirement, as decided by lots drawn by the Chairman, is in the sequence given. The President expressed gratitude to the retiring members of Council for their services to the Society.

ELECTION OF AN HONORARY MEMBER. Council had nominated Prof. T. G. Tutin. The President said that, according to Rule 23(e) of the Society, botanists whether British or Foreign who have rendered special service to the Society or to its objects may, on the recommendation of the Council, be elected Honorary Members. Prof. Tutin has rendered special service both to the Society, in the offices he has held, and to its objects, in his editorship of the *Flora of the British Isles*, in the papers he has written, and in the part he has played in establishing contacts with foreign botanists, and he is eligible on both of the alternative qualifications under the Rule. Prof. Tutin was elected unanimously and with acclamation, and briefly returned thanks.

ELECTION OF AN HONORARY AUDITOR. Mr. J. H. G. Peterken was prepared to continue, and his election was proposed by Mr. Collett, seconded by Mr. Bangerter, and carried. The President expressed the Society's thanks to Mr. Peterken for his help in the past nine years, and to the University authorities for the facilities placed at our disposal for this meeting and other meetings during the week-end.

There being no further business, the President thanked members for their attendance and declared the Meeting closed at 12.37 p.m.

J. G. D.
B.W.

ASSISTANT SECRETARY'S REPORT FOR 1960

During 1960, 93 new members joined the Society, this being 17 less than in 1959, and 2 less than in 1958. Of the new members 1 was an Honorary member, 63 were Ordinary members, 10 Subscriber members, 15 Junior members and 4 Family members.

Losses were 65, this being 93 less than in 1959, and 2 less than in 1958. Of these 36 members resigned, 22 ceased to be members under the operation of Rule 29, and we deeply regret having to record the deaths of the 7 following members:—Rt. Hon. H. T. Baker, F. T. Hall, E. Marsden-Jones, K. J. F. Park, D. L. H. Porter, Miss A. J. M. Shirras and R. Waterfield.

A new Honorary member is Professor W. H. Camp.

New Ordinary members are:—G. H. Ballantyne, G. Bates, Miss T. A. Bence, Miss J. K. Bowden, Mrs. M. Briggs, A. Bristow, B. S. Brookes, Miss H. M. Brown, Miss N. Churchman (rejoined), Mrs. S. W. Clapp, Mrs. R. Clark, Mrs. H. L. Crook, Mrs. M. W. Cullen, Dr. J. Dainty, Miss G. Elwell, Mrs. V. M. B. Follett, Dr. W. D. Foster, H. H. Fowkes, A. Gibson, Mrs. M. R. Gilson, Miss D. Glendinning, B. Goater, G. T. Goodman, Miss A. D. Gowing, D. J. R. Haigh, A. Hitchen, Miss D. S. Hobson, J. M. Hodgson, Mrs. F. Houseman, C. Hussein, Dr. E. Launert, R. N. Lester, D. Lloydlangston, A. G. Long, G. Ll. Lucas, J. K. Marshall, Mrs. R. C. May, Miss S. Megaw, G. Meredith, Mrs. C. W. Murray, Mrs. B. Nash, Miss S. Nicól, A. Pedersen, A. A. Percy, J. R. Phillips, Miss P. Phornprapha, Dr. D. A. Ratcliffe, Miss M. Ray, W. A. Richardson, Lord James of Rusholme, E. M. Rutter, B. F. C. Sennitt, Dr. A. Blacketer-Simmonds, Dr. A. G. Spooner, Dr. A. J. Stevens, Lt. I. D. Teesdale, J. M. Thomas, M. Walpole, W. S. Webster, Dr. D. J. B. White, Miss E. Whittaker, Miss H. P. Wilkinson, and Dr. A. J. Willis.

New Junior members are:—Miss D. Archer, Miss J. D. Butler, P. C. D. Cazalet, D. F. Chamberlain, Miss S. M. Coles, M. G. Collet, Miss S. M. Dexter, J. Digby, Miss V. Matthews, M. M. Oakes, Miss J. Pickering, Miss H. E. Reeve, R. F. Taylor, Miss C. E. G. Tutin, and I. C. West.

New Subscriber members are:—Dept. of Agriculture and Stock, Brisbane; Leicester University Library; Museu Laboratório e Jardim Botânico, Lisbon; Imperial College of Science and Technology, London; National Botanic Garden, Lucknow; Istituto ed Orto Botanico, Università di Padova; Penarth Grammar School; Portsmouth City Library; Sorby Natural History Society, Sheffield, and Biologisch Station, Wijster.

New Family members are:—Mrs. J. Aslett, H. L. Crook, W. H. Hunt, and Dr. W. Tutin.

D. H. Kent.

January 1961.

OBITUARIES

Charles Avery (1880-1960)—Charles Avery died in August 1960, a few days after attaining his eightieth birthday. Of a quiet and retiring disposition, his long life was, apart from active service in the 1914-1918 war, spent in west London. He devoted his ample leisure to roaming over the Surrey Commons within reach of Fulham in search of wild flowers, and later of mosses and liverworts. Some thirty years ago he became attracted to the study of Rubi and was encouraged to collect by the late W. C. R. Watson. He was a born collector: his memory was phenomenal and his judgement sound. He collected several hundred specimens, choosing only those examples which satisfied his interpretation of the book descriptions of the several species. Watson, who compiled the records for *Rubus* spp. in the *Hand List of Plants in the London Area*, (Supplement to *London Naturalist*, **31**, 1952) wrote:—"In the case of Middlesex, Bucks., and much of Surrey and Herts., I have had the assistance of Mr. C. Avery of Fulham, and he has been the first finder of several of the species here recorded for these counties. Hardly a year has passed without his bringing me some fresh species to be added to the list. . . ." Of the 220 or more species mentioned in the *Hand List* almost all are represented in Avery's herbarium together with many others. As practically all the sheets passed through Watson's hand, they may be looked upon as representative examples of the species described in Watson's "Handbook". Avery's specimens are preserved in the herbarium of the South London Botanical Institute.

C. Avery was joint author with W. C. R. Watson of the "Brambles of Middlesex" (*London Naturalist*, **26**, 66-73, 1947). His name is commemorated in *Rubus averyanus* W. R. C. Wats., a bramble at present only known in Surrey where it extends from Walton Heath to Chobham Ridges.—J. E. Woodhead.

Harold Trevor Baker (1877-1960)—The Rt. Hon. H. T. Baker, P.C., an Honorary Member, and Chairman of the Society for fifteen of the most critical years in its history, died at his home at Winchester on July 12, 1960, after a long illness. He left a legacy to the Society of £100.

He was born on January 22, 1877, the son of Sir John Baker, sometime M.P. for Portsmouth. Educated at Winchester and New College, Oxford, where he gained the highest awards for classical scholarship, he was called to the Bar in 1903. He entered Parliament as Liberal Member for Accrington in 1910, and became Parliamentary Private Secretary to Viscount Haldane, the Secretary of State for War. Two years later he was appointed Financial Secretary to the War Office. In 1914 he became a member of the Army Council, was sworn of the Privy Council a year later at the age of 38, and was Inspector of

Quartermaster-General Services from 1916 to 1918. In that year his Parliamentary career came to an end.

Later in life his interests were centred round the colleges where he had received his education. He became an Honorary Fellow of Winchester College in 1933, and was Warden from 1936 to 1946. In addition, he acted as Bursar during the difficult years of the Second World War. In 1944 he was elected Honorary Fellow of New College, Oxford.

Mr. Baker joined the Botanical Society and Exchange Club of the British Isles in 1922 and was frequently present at the house parties and other social functions mentioned in our annual Reports. In 1930 he was named as a member of the Advisory Committee appointed by the Secretary, G. C. Druce, "to choose his successor in the event of his death". Druce died on February 29, 1932, the Advisory Committee met on March 15, and a General Meeting of the Society was called for May 9. At this meeting Baker was elected as Chairman and continued in this office until April 1947.

The difficulties and potential dissension envisaged at the time he assumed office would have daunted any man lacking Baker's wide experience. No doubt his early training as President of the Oxford Union, as a candidate in Parliamentary elections, and in public affairs, provided outstanding qualifications for the task, but even so it is remarkable that he had such success in steering the Society's affairs on to a democratic basis, bringing together so many interests.

In 1932 the spirit of British botany was very different from the general collaboration which prevails to-day. Druce, at his death, had been the Secretary of our Society for about 30 years and claimed that he was appointed with a mandate "to manage its affairs". His interpretation of management differed little from sole ownership, and the Society's publications were mainly his own writings and the approved contributions of his friends, while the meetings of the Society were the social activities of the Secretary. Druce did much to raise the status of our organization by devoting a great deal of time and money to its affairs, but he ruled it as an autocrat. There were no elections, and he was the only officer; facilities were denied to botanists of whom he disapproved. Matters were made worse by the strong and often unorthodox views which Druce held on nomenclature and other matters which were published in our Reports and criticised elsewhere. To this cleavage between supporters of Druce and his opponents must be added the rivalry between our Society and the Watson Botanical Exchange Club, and the then still persisting tradition of difficult relations between the Natural History Museum and Kew. British botany in 1932 was a complex of interrelated rival camps.

This was the situation with which Baker and his fellow members of the Advisory Committee were faced. Their recommendation included reorganization of the Society on a constitutional basis by the election of Officers and Committee, and this was implemented within two months. The General Committee of 21 was most carefully chosen to include botanists representing as wide a range of interests as possible, and Baker, as its Chairman, was responsible for steering the new body through its initial difficulties and moulding interests so recently in conflict into working for a common end. Only seven years later the outbreak of war brought fresh troubles, including the deaths of our Editor and Treasurer, the absence of our Secretary and other key workers in the Forces, the destruction of our financial records by enemy action, and the dislocation of all normal activities. Throughout this second crisis Baker continued as Chairman, travelling to London to attend all the meetings of the Committee and members it was possible to arrange, and conducting other business with the officers by correspondence.

To his period of Chairmanship must be attributed much of the credit for the astonishing difference between the spirit which prevails in British botany to-day and that ruling in 1932. His success as Chairman owed as much to his personal qualities as to his wide experience. His standing commanded respect, and his quiet dignity, great patience, and good humour earned it. He was completely unbiassed and the fact that he made no attempt to do scientific work freed him from any temptation to take sides in the controversies of the day. His sympathy and charm, combined with quick perception of the fundamental problems involved, often solved differences of opinion almost as soon as they arose. As a botanist his contribution to our Society was restricted to a few records, but his statesmanlike qualities did more to advance our work than the efforts of almost any other officer during the fateful years he acted as Chairman. It is an honour to be able to put on record the extent of our debt to this kindly man we held in such great respect.—

J. E. LOUSLEY.

ERIC MARSDEN MARSDEN-JONES, F.L.S., F.R.E.S. (1887-1960).—E. M. Marsden-Jones was born at Tilston Rectory, near Malpas, Cheshire, on 8 May 1887. He was the only child of the Rev. Moris Jones and was educated at Repton School. A serious accident to his spine at school when he was about 17 resulted in his having to spend several years on his back and he suffered all his life from the effects of the injury. From his early school days he was interested in various aspects of natural history, especially in botany. The experimental side of the subject particularly attracted him and he made contacts with Professor W. Bateson and Mr. E. A. Bowles. He married Miss Phyllis Dunn in 1921 and his wife survives him. After a short period at Bournemouth he and his wife and mother settled at Potterne, near Devizes, Wiltshire, and it was there that the Potterne Biological Station was started in 1923. The area of about 2 acres was devoted to the growing and hybridization of British plants and was maintained till 1940.

The work at Potterne was mainly in three directions: the building up of a living collection of British plants, genetical experiments, and transplant experiments. The collection of British plants finally consisted of over 800 herbaceous species from known wild localities. The material was carefully determined, constantly checked, and made available freely to numerous research workers, students, and scientific institutions. Seeds were distributed to correspondents in many parts of the world. The collection has now been presented to Dauntsey School, Lavington, and is there used for teaching purposes.

The writer of this notice first met Marsden-Jones in 1924 and from then worked with him on the experimental taxonomy of various British plants and on the Transplant Experiments of the British Ecological Society. Work was concentrated on the Bladder Campions (*Silene maritima* and *S. vulgaris*) and on British species of *Centaurea*, but species of *Ranunculus* (including *R. ficaria*), *Saxifraga*, and *Anthyllis* were also investigated by field and herbarium research and by very many genetical experiments. Thousands of living plants were scored for numerous characters—some directly *in situ* in the wild, some grown from wild seed of known origin, and some resulting from controlled selfings and crossings. A series of papers was published in the *Journal of Genetics*, the *Kew Bulletin*, and other scientific periodicals. A book, *British Knapweeds*, was published by the Ray Society, London, in 1954 and another, *Bladder Campions*, by the same society in 1957.

The transplant experiments involved the growing of 26 ramets of one clone of various species on every one of five distinct and contrasting soils at Potterne, with controls at Kew, and the results appeared in a series of reports in the *Journal of Ecology* from 1930 to 1945.

Marsden-Jones also investigated with Professor F. E. Weiss the genetics of flower colour in *Anagallis arvensis* (*Proc. Linn. Soc.*, **171**: 27-29, 1960) and published accounts of pollination in *Primula vulgaris* and *Ranunculus ficaria*, and on the life-history of the marble gall (*Adleria kollari*). In the year before his death he was investigating pollination in *Epilobium*, *Hedera*, and *Eupatorium*.

Voucher specimens of our joint researches, the index to the experiments at Potterne, and the fine series of samples of stock plants and offspring mounted with great care on cards have been presented to the Herbarium, Royal Botanic Gardens, Kew, the last through the Bentham-Moxon Trustees.

Marsden-Jones was a very careful research worker and was an excellent cultivator of plants. He was meticulously careful and if there was any suspicion of an experiment having gone wrong it was scrapped and re-started. With scoring we had to agree on every point and doubts and uncertainties were considered and re-considered till an agreed decision was reached. Our relationships were always cordial and for over 35 years we collaborated with no trace of a quarrel. His kindness and generosity are widely remembered. He was elected a Fellow of the Linnean Society in 1914 and was also a Fellow of the Royal Horticultural Society and of the Royal Entomological Society. Since October 1928 he was Honorary Associate for Transplant and Breeding Experiments, under the Royal Botanic Gardens, Kew. He was a member of the Botanical Society of the British Isles from 1920 (or perhaps slightly earlier). He died, after an illness of about three weeks in a nursing home in Bath, on 26 August 1960.—W. B. TURRILL.

PERSONALIA AND NOTICES TO MEMBERS

SAGINA

Mr. N. Jardine, 82 Hersham Road, Walton-on-Thames, Surrey, is working on the taxonomy of *Sagina ciliata*, and the plants formerly referred to *S. filicaulis* and *S. reuteri*, and would be grateful for living or herbarium material, and for records.

ULEX

Mr. M. J. Woodman, Nature Conservancy, Furzebrook Research Station, Wareham, Dorset, would be grateful for viable seeds of *Ulex* species.

POTENTILLA

Mr G. L. Smith, 19 Casterton Road, Stamford, Lincs., would be grateful for living, or herbarium, material of *Potentilla tabernaemontani* and *P. crantzii*.

SENECIO INTEGRIFOLIUS (L.) Clairv.

Miss Ursula K. Smith, Botany and Zoology Dept., Brighton Technical College, is engaged on research on the autecology and history of *Senecio integrifolius* and would be grateful for living material and seed.

CREPIS

Mr. J. B. Marshall, Department of Botany, British Museum (Natural History), Cromwell Road, London, S.W.7, is studying the distribution of the British species of *Crepis*. Much confusion and misidentification has occurred in the past, and fresh material, herbarium specimens (on loan for a short period) and records would be welcome. Material is particularly requested from the Midlands, northern England, Scotland and Ireland.

CAREX CHORDORRHIZA L.f.

Members are requested to call at the Head Keeper's house for permission before visiting *Carex chordorrhiza* at Altnaharra, Sutherland.

LOLIUM PERENNE and *DACTYLIS GLOMERATA*

Dr. A. D. Bradshaw, Dept. of Agricultural Botany, University College of North Wales, Bangor, is anxious to find habitats where the plants growing have been subjected to a high nitrogen level for a long time (20 years or more). This is in the hope of finding local populations of *Lolium perenne* and *Dactylis golmerata* which have become adapted to high nitrogen levels—outfall beds of old established sewage works are suggested.

FLORA OF NORFOLK

Dr. C. P. Petch and Mr. E. L. Swann (282 Wootton Road, King's Lynn, Norfolk) are collecting data relating to the flora of Norfolk. The latter would be glad to receive any information on the subject, particularly with reference to collections (other than those in the National Herbaria) and personal records and notes.

SOCIETY FOR ECONOMIC BOTANY

The Society for Economic Botany, an international scientific organization, invites your participation and welcomes your membership.

The objective of the Society is the promotion and stimulation of scientific studies of plants useful to man. The methods of achieving this objective are annual meetings, technical conferences and publication of *Economic Botany*, the official journal of the Society.

Present members in The Society for Economic Botany represent nearly all scientific disciplines: anthropology, pharmacology, geography, agriculture, chemistry, physics, and all fields of botanical science. The only prerequisite for membership is an interest in the study of the past, present, or future use of plants to man.

Membership dues are $7.50 (U.S.) annually, and include one year's subscription to *Economic Botany*. *Economic Botany* publishes monographs, review articles, and original manuscripts on all subjects relating to the use of plants and plant products.

Inquiries and dues can be sent directly to the Treasurer, Richard M. Klein, The New York Botanical Garden, Bronx Park, New York, 58, N.Y. (U.S.A.).

BACK-NUMBERS OF "WATSONIA" AND "PROCEEDINGS"

Part of the Society's revenue is obtained from the sale of sets of *Watsonia* and *Proceedings* to booksellers and libraries.

Unfortunately, certain parts of both periodicals are now in short supply and it will soon become difficult to prepare complete "runs". The numbers concerned are *Watsonia*, Vol. 2, Parts 5 and 6, and Vol. 3, Part 5, and *Proceedings*, Vol. 2, Part 4. Members who have any of these parts that they no longer require are invited to assist the Society by sending them to Mr. E. B. Bangerter, c/o Dept. of Botany, British Museum (Natural History), Cromwell Road, London, S.W.7.

B.S.B.I. BOOK SERVICE

Many county Floras and other botanical books are out of print and difficult to obtain and the officers of the Society receive many enquiries from members as to where they may be obtained.

A card index of members' desiderata has now been prepared with the object of assisting them to obtain books they need to carry out their studies.

The index has been prepared by the Hon. Assistant Secretary, Mr. D. H. Kent, 75 Adelaide Road, London, W.13, and members desiring to make use of this facility are invited to write to him giving details of the books which they are anxious to acquire. A stamped addressed postcard, for reply, should be sent for each book required. It must be pointed out that some botanical works are very scarce indeed and it may be some time before they can be tracked down; every effort will, however, be made to trace copies of books required.

Members who have botanical books for disposal are also invited to write to Mr. Kent giving details of the volumes concerned and their prices.

THREATS TO BRITISH FLORA

Members are urged to report to Dr. D. H. Dalby, 108 Gordon Road, Camberley, Surrey, any threats to the British flora. The Council has appointed a Conservation Committee to deal with such matters and every effort will be made "to promote in every way possible the conservation of the British flora".

TOXIC SPRAYS

The Society is collecting information about the effect on native vegetation of toxic chemicals used for spraying crops. The increasing use of weed-killing chemicals on arable land implies a threat to neighbouring uncultivated land or woods since the spray can be carried a considerable distance under suitable conditions. Members who observe damage from this cause are asked to send full details to Dr. D. H. Dalby, 108 Gordon Road, Camberley, Surrey.

ADVERTISEMENTS

A limited number of relevant advertisements will be accepted for the Society's publications as space permits. Enquiries should be addressed to Mr. D. H. Kent, 75 Adelaide Road, London, W.13.

BRITISH HERBARIA

An Index to the Location of Herbaria of British Vascular Plants

Compiled by D. H. KENT
with the assistance of
E. B. BANGERTER and J. E. LOUSLEY

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OF THE
BOTANICAL SOCIETY OF THE BRITISH ISLES

Editor: D. H. KENT

Vol. 4 SEPTEMBER, 1962 Pt. 4

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Continued on inside of back cover.

HINTS ON THE DETERMINATION OF SOME CRITICAL SPECIES, MICROSPECIES, SUBSPECIES, VARIETIES AND HYBRIDS IN THE BRITISH FLORA*

Compiled by FRANKLYN PERRING

This list includes some of the taxa which it is hoped will be included in a critical supplement to the *Atlas of the British Flora*, the data for which must be collected during the next two years.

The marginal numeration and nomenclature used follow Dandy (1958): the numbers following the name of the taxa in square brackets are the Maps Scheme code numbers.

CRITICAL SPECIES AND MICROSPECIES

18/2.2 *Athyrium flexile* (Newm.) Druce [210b]

Differs from *A. alpestre* in the very short (1-2 cm.) petioles, smaller and relatively narrower leaves, suddenly bent near the base. The pinnae are short and the sori, usually with very few sporangia, are borne mainly on the lower part of the leaf. Mountains of Scotland.

21/6 *Dryopteris lanceolatocristata* (Hoffm.) Alston (*D. spinulosa* Watt) [666]

Some forms of *D. dilatata* have more or less concolorous scales and have been named *D. lanceolatocristata* in error: this character alone should not be relied upon in separating these two species.

D. lanceolatocristata is usually *without* glands on the indusium, and can generally be distinguished by the lighter, yellowish-green of its leaves, the less inrolled pinnules, and the creeping rootstock.

25/1 *Polypodium vulgare* agg.

Three segregates are now recognised in Britain and the following key to their determination has been drawn up by A. C. Jermy and Dr. M. G. Shivas:

1. Fronds linear-lanceolate (more than half the pinnae ± equal in length), basal pair of pinnae not inflexed; sori circular in outline, number of thickened cells in the annulus 10-14, appearing dark brown when sporangial wall still yellow. New fronds produced in early summer, spores ripen July-August. Common.
P. vulgare L. *s.s.* [1544b]

Fronds ovate or triangular, basal pair of pinnae usually inflexed; some of the sori oval in outline, number of thickened cells in the annulus less than 10, darkening at same time as sporangial wall. 2.

---

*First issued as a separate publication in March 1962.

2. Fronds broadly ovate to triangular (longest pinnae 2nd pair from base), not coriaceous; number of thickened cells in annulus 4-7, paraphyses present amongst the sporangia. New fronds produced in autumn, spores ripen in late autumn or following spring. Rare, on limestone rock-faces and walls. *P. australe* Fée [1544a]

Fronds ovate to ovate-lanceolate (longest pinnae 4th-6th pair from base), coriaceous; number of thickened cells in annulus 8 or 9, paraphyses absent. New fronds produced in summer, spores ripen July-December. Common. *P. interjectum* Shivas [1544c]

For further details see Shivas (1961).

58/3 *Papaver lecoqii* Lamotte [1429]

P. lecoqii can readily be distinguished from *P. dubium* L. by having latex which turns yellow on exposure to the air. The capsule character given in C.T. & W. is not reliable. *P. lecoqii* is most likely to be found on limestone soils in south-east England.

102/1-2 *Rorippa nasturtium-aquaticum* agg.

The two segregates are best separated by the following characters:

Pods relatively short (13-18 mm.), broad and straight; seeds with about 25 depressions on the surface, easily seen with a hand lens.
R. nasturtium-aquaticum (L.) Hayek [1347]

Pods longer (16-22 mm.) narrow and usually curved; seeds with about 100 depressions, not easily seen under a lens.
R. microphylla (Boenn.) Hyland. [1346]

N.B. The number of rows of seeds is *not* a reliable character. The hybrid is almost sterile—but may have 1 or 2 ripe seeds/pod. (q.v., page 380).

141/1-2 *Arenaria serpyllifolia* agg.

The following key for the separation of the two segregates has been provided by A. O. Chater and G. Halliday:

Sepals c. 3-4·5 mm.; capsule slightly exceeding sepals, less than twice as long as wide, broadly ovoid-conic, distinctly swollen at base. *A. serpyllifolia* L. [162]

Sepals usually less than 3 mm.; capsule usually equalling or shorter than sepals, usually twice as long as wide, straight-sided.
A. leptoclados (Reichb.) Guss. [163]

A. leptoclados is more delicate in all its parts, but the capsule-shape is the only definite character.

169/4 *Erodium glutinosum* Dumort. [747]

This species may be separated from *E. cicutarium* (L.) L'Hérit. by following this key (after C.T. & W.):

Flowers zygomorphic, mostly 12 mm. in diam. or more, often with blackish spot at base of the upper petals; fruit with a conspicuous pit at the apex, beak 22-40 mm.; peduncles mostly 3-or more flowered; indumentum variable. *E. cicutarium*

Flowers scarcely zygomorphic, c. 7 mm. diam., unspotted; fruit with small pit at apex, beak 15-24 mm.; peduncles mostly 2-3-flowered; plant densely glandular. *E. glutinosum*

E. glutinosum is confined to dunes etc. near the sea mainly on the west coast. It should not be confused with *E. cicutarium* subsp. *dunense* (q.v., page 374).

192/O *Trifolium occidentale* D. E. Coombe [2268]

This species has recently been described by Coombe (1961), and the following notes on how it may be distinguished from *T. repens* L. are taken from his paper:

Leaflets dark green and glaucous without light or dark markings, smaller, thicker, rarely exceeding 10 × 10 mm. orbicular, or very broadly cuneate at the base; margin very narrowly hyaline, with fewer less prominent teeth; lateral veins fewer, not translucent to strong diffuse light with the naked eye; petiole and petiolules with sparse but persistent flexuous erecto-patent colourless hairs to 1 mm. Heads fewer flowered, often c.20; flowers creamy-white, scentless; the upper two calyx-teeth often with one or two prominent teeth on the upper margins. Flowers earlier, from late March to early July. Only known from W. Cornwall, Isles of Scilly and the Channel Isles.

211/9 *Rubus caesius* L. [1726]

It is probable that this species has been over-recorded in error for taxa of *Rubus fruticosus* agg., particularly in north and west Britain. Note that *R. caesius* has ternate leaves and lanceolate stipules and that the stems and druplets are covered in a whitish bloom (pruinose). The druplets are usually few in number (c.2-5), and never more than 20 occur.

211/11.129 *Rubus ulmifolius* Schott [1732]

This segregate is an easily recognised member of *R. fruticosus* agg. E. S. Edees has provided the following description:

Stem waxy (dark) on the side turned to the sun; prickles strong like those of the Dog Rose; leaflets small, smooth, convex, dark green above and white below.

These characters make it possible to identify *R. ulmifolius* almost throughout the year, as its leaves are long-persistent. It is the most frequent bramble in lowland England where it occurs particularly on the limestones and heavy clays, and is probably only rare on acid sands.

221/1-2 *Aphanes arvensis* agg.

The two segregates are best separated by the following characters:

Lobes of stipules surrounding inflorescence triangular-ovate; fruit 2·2—2·6 mm. including divergent sepals.
A. arvensis L. [132]

Lobes of stipules oblong; fruit 1·4-1·8 mm. including the convergent sepals.
A. microcarpa (Boiss. & Reut.) Rothm. [133]

Both species occur throughout the British Isles: *A. microcarpa* is more frequent on acid soils.

254/5 *Epilobium roseum* Schreb. [700]

This species has perhaps been over-recorded for other species of *Epilobium* or hybrids. It may be recognised by its clavate stigma (not 4-lobed as in *E. montanum* L.), its pale coloured petals, and its *long*-stalked (3-20 mm.) leaves which are ovate-elliptical to lanceolate-elliptical, narrowed both to the acute apex and to the cuneate base. Like *E. adenocaulon* it has many glandular hairs on the upper part of the stem but that species has *short*-stalked leaves (1·5-3 mm.) and seeds with a rounded pellucid appendage lacking in *E. roseum*. Not as frequent as *E. adenocaulon,* which is now common in southern England.

254/7-8 *Epilobium adnatum* agg.

The two segregates are best separated by the following characters:

Leaves generally parallel-sided, their limbs decurrent down the stem, surface shiny; petals 5-7 mm., pale lilac.
E. adnatum Griseb. [689]

Leaves lanceolate, narrowed to a short stalk, never decurrent, surface dull; petals 10-12 mm., red.
E. lamyi F. W. Schultz [693]

Continental authorities often treat these two as sub-species because they lack precise qualitative distinction. The aggregate is often confused with *E. obscurum* Schreb. but that species always has a few patent glandular hairs on the calyx-tube which can be seen with a hand lens if the plant is held up to the light.

E. adnatum agg. has a southern distribution and is probably casual in Scotland. *E. obscurum* is one of the commonest species of the genus in the country except in parts of eastern England. It has apparently been overlooked and under-recorded.

258/3 *Circaea alpina* L. [511]

This species is much rarer than was once appreciated and confirmed records are only known from v.-cs 41, 42, 48, 49, 60, 65, 69, 70, 97, 100.

Recent work by Dr. P. Raven has suggested that the following characters are best used in separating it from *C. × intermedia* Ehrh:

Open flowers clustered at stem-apex; petals less than 1 mm. long. *C. alpina*

Open flowers well spaced along the rachis; petals more than 2 mm. long. *C. × intermedia*

262/1-2 *Callitriche stagnalis* agg.

The two segregates can be separated when well-developed flowering and fruiting material is available. The following key is based on the work of Schotsman (1954):

Rosette leaves elliptical; stigmas up to 5 mm., erect or spreading; seeds in T.S. of the fruit parallel. *C. platycarpa* Kütz. [307a]

Rosette leaves almost circular; stigmas 2-3 mm., arcuate-recurved; seeds in T.S. of the fruit divergent. *C. stagnalis* Scop. [307]

Both species probably occur throughout the British Isles.

262/4 *Callitriche intermedia* Hoffm. [303]

This species has often been recorded in error for submerged forms of *C. platycarpa* Kütz. from which, however, it may be distinguished by its almost linear, not elliptical, leaves which are *widened* at the tip like a bicycle spanner. In both species the apex is emarginate but only in *C. intermedia* is the leaf also widest here. *C. intermedia* may also be distinguished by the stigmas, the bases of which are pressed close to the lateral faces of the fruit: occasionally subsp. *pedunculata* (DC.) Syme [303b] may be found in which the fruits are borne on stalks up to 50 mm. Rare in east England, probably frequent elsewhere.

320/1 *Polygonum aviculare* agg.

Four segregates are now recognised in Britain, and the following key to their determination has been drawn up by B. T. Styles:

1. Branch- and stem-leaves ± equal; persistent perianth divided for half its length; fruit with 2 sides convex, 1 concave.
P. arenastrum Bor. (*P. aequale* Lindm.) [1520]
Branch-leaves much smaller than stem-leaves; persistent perianth divided almost to base; fruits trigonous with three concave sides. 2

2. Stem-leaves narrow, linear-lanceolate, 1-4 mm. broad; perianth segments and fruit narrow, fruit exserted.
P. rurivagum Jord. [1540]
Stem-leaves broad, 5-18 mm.; perianth-segments overlapping, fruit broad. 3

3. Stem-leaves ovate-lanceolate, subsessile or with petioles c. 2 mm. included in the ochreae; fruit 2·5-3·5 mm.
P. aviculare L. *s.s.* [1523]
Stem-leaves obovate-spathulate, petioles 4-8 mm., projecting from the ochreae; fruit 3·5-4·5 mm.
P. boreale (Lange) Small [2269]

P. aviculare and *P. arenastrum* are probably throughout the British Isles—don't try to separate these two on leaf-size alone.

P. rurivagum is a cornfield weed on chalk and limestone in the south. *P. boreale* has so far only been found in Orkney and Shetland.

325/1·3 *Rumex tenuifolius* (Wallr.) Löve [1756]

This segregate may be separated from *R. acetosella* L. *sensu stricto* by having the stems decumbent at the base and narrow leaves 7-10 times as long as broad, with the margins inrolled.

R. tenuifolius occurs on the poorest acid soils.

342/4 *Populus nigra* L. [1554]

This has been confused with *P.* × *canadensis* Moench, but the two species can be separated if attention is paid to the nature of the branching (see C.T. & W.):

Trunk and larger branches usually bearing large swollen bosses; branches spreading, arching downwards, forming a wide crown. *P. nigra*

Trunk without bosses; branches ascending, curving upwards, forming a fan-like crown. *P.* × *canadensis*

P. nigra is much the less common of the two and may be found in eastern and central England where it is possibly native by streams and in wet woods.

372/2-3 *Anagallis arvensis* agg.

There are two blue pimpernels in Britain which can best be separated by the following characters:

Pedicels considerably exceeding length of leaf; petals up to 6 mm. broad, fringed with very numerous 3-celled glands. *A. arvensis* L. var. *caerulea* Lüdi [99c]

Pedicels not, or only slightly exceeding length of leaf; petals up to 3·5 mm. broad, fringed with few 4-celled glands. *A. foemina* Mill. [99b]

A. arvensis var. *caerulea* is merely a colour variety of *A. arvensis* so that the latter can always be used for reference.

392/1-2 *Symphytum officinale* L. [2024] and *S. asperum* Lepech. [2023]

The limits of these species are disputed; it is probable that extensive hybridisation has occurred in Britain or that hybrid stock has been introduced. For the time being it seems wisest to take a narrow view and only to class as species plants with the following combination of characters:

Flowers white or pale pink, anthers in front view longer than exposed portion of filaments; leaves strongly decurrent; pubescence soft, hairs not swollen at the base. *S. officinale*

Flowers blue, anthers in front view shorter than filaments; leaves not decurrent, with distinct petioles; pubescence stiff, hairs swollen at the base. *S. asperum*

Any specimens belonging to this group without either of these two combinations should perhaps be placed under *S.* × *uplandicum* Nyman.

I am grateful to Professor J. G. Hawkes for his help with this diagnosis.

S. asperum is a very rare introduction: *S. officinale* occurs as a native in fens and marshes in eastern England.

400/1 & 4 *Myosotis scorpioides* L. (*M. palustris* (L.) Hill) [1322] and *M. caespitosa* K. F. Schultz [1319]

There has been some confusion between these two species because there is considerable overlap of characters often used to distinguish them in keys, for example flower-size. They are best separated as follows:

Style ± equalling the calyx-tube, calyx-teeth forming an equilateral triangle; hairs on lower part of stems spreading. *M. scorpioides*

Style half the length of the calyx-tube, calyx-teeth with sides $1\frac{1}{2}$-2 times as long as base (isosceles triangle); hairs of stem always appressed. *M. caespitosa*

I am grateful to A. E. Wade & D. Welch for their help with this diagnosis.

Both species are widespread in the British Isles but *M. caespitosa* is commoner in the north and west where *M. scorpioides* is probably only frequent near the coast. In eastern England *M. scorpioides* is commoner and *M. caespitosa* is restricted to less basic soils.

406/1-3 *Calystegia sepium* agg.

Although there is little difficulty in separating good material of *C. sepium* (L.) R.Br. and *C. silvatica* (Kit.) Griseb. three factors have confused the records:

(i) The occurrence of intermediate populations.
(ii) The existence of a third and, until recently, overlooked taxon, *C. pulchra* Brummitt & Heywood.
(iii) The continued use of *C. sepium* as an aggregate name.

The following key is after Brummitt & Heywood (1960), taking into account the work of Stace (1961):

1. Bracteoles not overlapping, flat or somewhat keeled at base, acute at apex; corolla less than 55 mm. long and stamens less than 18 mm. long, except in some pink-flowered plants; anthers 4·5-5·5 mm. *C. sepium* [311]

Bracteoles overlapping, saccate at the base, obtuse to truncate at apex; corolla more than 55 mm. long; stamens more than 23 mm.; anthers 6-7 mm. 2

2. Plant glabrous; corolla white, or (var. *zonata* Beauverd) with deep pink veins outside. *C. silvatica* [313]

Plant with sparse hairs on stem and usually petiole and peduncle; corolla pink with paler veins outside. *C. pulchra* [2266]

A fertile hybrid between *C. sepium* and *C. silvatica* also occurs, *C.* × *lucana* (Tenore) G. Don, and a description is given by Stace (1961). "Pedicels 30-100 mm. long; corolla white (? always), 41-62 mm. long; stamens 20-21 mm. long; style and stigma 20-23 mm. long; bracteoles broadly ovate, 14-25 mm. wide when flattened out, acute, obtuse or mucronate at apex, weakly cordate at base, slightly to strongly inflated, midrib very prominent especially at base, edges overlapping at each side and partially obscuring the calyx".

409/1-2 *Lycium chinense* agg.

Records of the two segregates *L. halimifolium* Mill. and *L. chinense* Mill. appear to have been confused. They are best separated as follows:

Leaves of fertile axillary shoots linear-lanceolate, tapering into a short petiole, 4-5 times as long as broad; lower stem-leaves lanceolate. *L. halimifolium* [1212]

Leaves of fertile axillary shoots ovate, 2-3 times as long as broad; lower stem-leaves distinctly rhomboid.
L. chinense [1211]

An examination of herbarium material suggests that many specimens of *L. halimifolium* have been misidentified as *L. chinense* in the past.

442/1-2 *Utricularia vulgaris* agg.

Because both species in this aggregate flower only sporadically (not at all in the northern part of their range), and as they cannot be separated on vegetative characters alone, their complete distribution is unknown. If flowering material is found, the segregates may be distinguished as follows (after C.T. & W.):

Upper pedicels 6-8 mm., rather stout; upper lip of corolla about as long as the projecting palate of the lower lip; margins of lower lip deflexed ± at right angles; fruit freely produced after flowering. *U. vulgaris* L. [2133]

Upper pedicels 11-15 mm., rather slender; upper lip of corolla about twice as long as the palate; lower lip ± flat, somewhat undulate; fruits rarely after flowering.
U. neglecta Lehm. [2131]

U. neglecta is probably more frequent in the north and west of Britain, *U. vulgaris* in the south and east.

538/1 *Arctium lappa* L.

Some confusion has arisen with this species, partly on taxonomic grounds, and partly because of the continued use of the name in the aggregate sense. It can be distinguished from other *Arctium* spp. in Britain by its large solitary, straw-coloured heads (42 mm. diam. including the phyllaries) on *long* stalks (c. 20 cm.) and by its *solid* petioles.

A. lappa is almost confined to south and east England, south Wales and south-east Ireland.

538/2 & 4 *Arctium minus* agg.

The taxonomic limits of species described within this aggregate are not clear. However, two extreme forms are recognisable and may be separated as follows:

Heads large (diam., including phyllaries, of mature heads c. 38 mm.), sessile and with c.3 heads clustered at the end of arched branches; petals of open flowers not protruding beyond phyllaries.
A. nemorosum Lejeune (*A. vulgare auct.*) [153]

Heads small (diam. 20-30 mm.), on short stalks (c. 10 mm.) of primary and secondary branches; petals of open flowers protruding beyond phyllaries.
A. minus Bernh. [152]

Intermediates without these combinations of characters are widespread and should be referred to a specialist for naming.

A. nemorosum occurs mainly in the north of England and in Scotland; *A. minus* is frequent in the south, particularly in woods.

544/6-7 *Centaurea nigra* agg.

The two species of this aggregate are best separated as follows:

Stems conspicuously swollen beneath the heads; appendages of bracts dark blackish brown, ± completely concealing the pale basal parts of the bracts. *C. nigra* L. [444b]

Stems not much swollen beneath the heads; appendages of bracts paler, not completely concealing the basal parts of the bracts. *C. nemoralis* Jord. [444a]

Intermediates between these two species often occur.

C. nigra is common in the north and on heavier and wetter soils in the south; *C. nemoralis* is common in the south, particularly on dry, calcareous soils.

550/2-3 *Leontodon hispidus* L. [1130] and *L. taraxacoides* (Vill.) Mérat (*L. leysseri* G. Beck) [1131]

Although these two species are not critical they appear to have been confused, in some cases, with other yellow composites, e.g., unbranched forms of *Hypochaeris radicata* L. in north Scotland.

The two species of *Leontodon* are perhaps best separated as follows:

Outermost achenes surmounted by a cup of scarious scales; involucre not exceeding 10 mm.; outer florets grey-violet beneath. *L. taraxacoides*

Achenes all with feathery pappus; involucre exceeding 10 mm.; outer florets orange or reddish beneath. *L. hispidus*

It is not sufficient to depend upon the relative hairiness of the scape: an almost or wholly glabrous variety of *L. hispidus* occurs in this country (var. *glabratus* (Koch) Bischoff).

559/2 & 5 *Crepis vesicaria* subsp. *taraxacifolia* (Thuill.) Thell. [578] & *C. biennis* L. [571]

C. vesicaria has probably been over-recorded in north Britain in error for large-flowered plants of *C. capillaris* (L.) Wallr. (var. *anglica* Druce & Thell.). *C. biennis* has been recorded in error for *C. vesicaria,* the latter being the more common of the two in most areas. The species can perhaps best be separated by using the following key:

1. Achenes all gradually narrowed into a beak about as long as the achene; ribs of achene rough. *C. vesicaria*
   Achenes narrowed above, but not beaked; ribs of achene smooth. 2
2. Achenes 4-8 mm. usually with 13 ribs; inner bracts of involucre downy within. *C. biennis*
   Achenes 1-2·5 mm. with 10 ribs; inner bracts of involucre glabrous within. *C. capillaris*

560/1-4 *Taraxacum* agg.

Although this genus presents great difficulties, it is worthwhile attempting to place specimens into one of four aggregate species. Intermediates occur so that one cannot hope always to succeed. The following key may be helpful, but only if used on material collected before the end of May:

1. Involucral bracts all appressed. Marshes. *T. palustre* agg. [2037]
   Some involucral bracts, at least, spreading or reflexed. 2
2. Heads small, less than 1 cm. diam. across at base of pappus; inner involucral bracts with an appendage on the outer side, visible in side view in fresh material. Dry habitats, dunes, chalk downs, etc. *T. laevigatum* agg. [2036]
   Heads large, more than 1·5 cm. diam. at base of pappus; inner involucral bracts without an appendage. 3
3. Outer bracts of involucre narrowly lanceolate or linear, more than three times as long as broad, strongly reflexed; heads large, c. 2·0 cm. diam. at base of pappus, untidy in appearance. Common in man-made habitats. *T. officinale* agg. [2035]
   Outer bracts of involucre narrowly ovate, usually less than three times as long as broad, spreading; heads smaller, c. 1·7 cm. diam., neat. Frequent in permanent pastures, woodland rides and other semi-natural habitats. *T. spectabile* agg. [2038]

605/4 *Juncus compressus* Jacq. [1062]

This species has been frequently confused with *J. gerardii* Lois. in areas near the coast. The two can, however, be distinguished as follows:

Capsule obtuse, c. 1½ times as long as the light brown perianth; style shorter than capsule. *J. compressus*

Capsule acute, rarely exceeding the dark brown to blackish perianth; style at least as long as capsule. *J. gerardii*

J. compressus is a local species of calcareous wet meadows, and is probably confined to south and east England.

670/9 *Festuca tenuifolia* Sibth. [822b]

Festuca tenuifolia has been under-recorded. It can, however, be readily distinguished from *F. ovina* L. by its smaller (2·5-3·5 mm.) awnless lemmas and very slender (0·2-0·4 mm.) leaf blades.

F. tenuifolia occurs throughout the British Isles on acid sands, gravels and peats.

676/10-12 *Poa pratensis* agg.

Three segregates are now recognised and they are described in Hubbard (1954), on whose work the following key to their separation is based:

1. Basal leaf-blades bristle-like, 1-2 mm. wide; lemmas 2-3 mm. long. *Poa angustifolia* L. [1506b]
   Basal leaf-blades 2-4 mm. wide; lemmas 3-5 mm. long. 2
2. Panicle-branches mostly in clusters of 3 to 5 at a node; culms in tufts; glumes abruptly pointed. *P. pratensis* L. [1506d]
   Panicle-branches usually in pairs or threes; culms mostly scattered or solitary; glumes tapering to a finely pointed tip. *P. subcaerulea* Sm. [1506e]

Poa pratensis L. is widespread, but *P. angustifolia* is a plant of dry grassland and wall-tops in southern England while *P. subcaerulea* is more frequent in damp habitats in the north and west.

683/12 *Bromus thominii* Hardouin [275]

This segregate has probably been overlooked. It can be distinguished from *B. mollis* L. as follows:

Lemmas 6·5-7·5 mm.; spikelets 10-15 mm., glabrous. *B. thominii*

Lemmas 8-9 mm.; spikelets 15-20 mm., usually pubescent. *B. mollis*

B. thominii is probably widespread in lowland Britain in hayfields, and on roadsides and wasteland.

683/14 *Bromus racemosus* L. [271]

This species has probably been over-recorded in error for *B. commutatus* Schrad. However, the two taxa can be separated on floral characters as follows (after Hubbard, 1954):

Spikelets 12-16 mm.; lemmas 6·5-8 mm. *B. racemosus*
Spikelets 18-28 mm.; lemmas 8-11 mm . *B. commutatus*

B. racemosus is a rare grass of meadows, arable fields and waste places in south and central England.

707/1-2 *Phleum pratense* agg.

It is almost impossible to separate the two segregates on the length of the panicle alone, if this is less than 8 cm. They may, however, be distinguished if measurements of populations are made as follows:

Panicles 4-5 mm. wide, 1-6 (-8) cm. long; leaf blade of 3rd leaf below panicle less than 4 mm. wide, 2-8 (-15) cm. long. *P. bertolonii* DC. (*P. nodosum* auct.) [1461]
Panicles 6-10 mm. wide, (3)-6-15 cm. long; leaf blade of 3rd leaf below panicle 4-6 mm. wide, up to 30 cm. long. *P. pratense* L. [1463]

As a quick guide:

Sum of width of panicle and width of leaf less than 9 mm. *P. bertolonii*
Sum of width of panicle and width of leaf more than 9 mm. *P. pratense*

P. bertolonii is generally in drier permanent pastures whereas *P. pratense* is more often clearly an escape from cultivation on field margins, roadsides and in waste places: it is probably only native in water meadows and other damp grasslands.

SUBSPECIES AND VARIETIES

29/1b. *Ophioglossum vulgatum* L. subsp. *ambiguum* (Coss. & Germ.) E. F. Warb. (subsp. *polyphyllum* E. F. Warb. *pro parte*) [1381a]

This subspecies may be separated from subsp. *vulgatum* as follows (after C.T. & W.):

Leaves solitary (exceptionally 2), rarely less than 8 cm.; sterile blade 3-15 cm.; sporangia (12-) 16-40 on each side of the spike. subsp. *vulgatum*
Leaves (1-) 2-3 together, 4-10 cm.; sterile blade 1·5-3·5 cm.; sporangia 6-14. subsp. *ambiguum*

Subsp. *ambiguum* is found in short turf near the sea in the north and west.

34/1a & b *Juniperus communis* L. subsp. *communis* and subsp. *nana* Syme

These two subspecies are best separated as follows:

At least the lower leaves of the stem spreading almost at right angles, 8-15 × c. 1 mm., gradually tapering to a long point; fruit globose. subsp. *communis* [1080a]
All the leaves ascending or loosely appressed, 4-10 × c. 1·5 mm., more suddenly contracted to a short point; fruit longer than broad. subsp. *nana* [1080b]

Subsp. *communis* is the more eastern and southern form, whereas subsp. *nana* occurs on moors and mountains in north and west Britain.

46/22a & b *Ranunculus aquatilis* L. subsp. *aquatilis* (including subsp. *radians* (Revel) Clapham) and subsp. *peltatus* (Schrank) Syme (including subsp. *sphaerospermus sensu* Clapham).

Experimental work recently carried out by C. D. K. Cook suggests that these two subspecies are probably best separated as follows:

Lobes of floating leaves usually dentate; peduncle in fruit usually shorter than petiole of subtending leaf, rarely exceeding 50 mm.; petals 5·0-9·75 (mean 7·4) mm. subsp. *aquatilis* [1643a]

Lobes of floating leaves crenate; peduncle in fruit usually longer than petiole of subtending leaf, rarely less than 50 mm.; petals 9·0-17·0 (mean 13·2) mm. subsp. *peltatus* [1643b]

46/24 *Ranunculus ficaria* L.

Three subspecies of *R. ficaria* have been recognised in Britain and may be separated as follows:

1. Fruiting specimens without bulbils in the axils of the leaves. subsp. *ficaria* [1649b]
   Fruiting specimens with bulbils. 2.
2. Bulbils generally rounded at apex or abruptly pointed; leaves small, less than 40 mm. wide. subsp. *bulbifer* (Albert) Lawalrée [1649a]
   Bulbils cone-shaped narrowing gradually to a point; leaves large, some, at least, 50 mm. wide. subsp. *ficariiformis* Rouy & Fouc. [1649c]

Subsp. *ficaria* occurs throughout Britain generally in full sunlight in wet meadows or on ditch-banks; subsp. *bulbifer* is rare or absent in the west of Britain, and elsewhere is usually found in semi-shade in copses and hedgerows; subsp. *ficariiformis* is very rare and in southern England only.

74/1 *Raphanus raphanistrum* L.

There is a great range of colour in the flowers of this species, and varietal rank has been given to three of the more widespread.
These three are:

var. *raphanistrum,* white petals. [1667c]

var. *flavus* Schub. & Mart., pale yellow petals with deep yellow veins [1667b]

var. *aureus* Wilmott, full golden-yellow petals. [1667a]

var. *raphanistrum* is commonest in the south, var. *aureus* in the extreme north and west; var. *flavus* is widespread.

113/4a & b *Viola riviniana* Reichb. subsp. *riviniana* and subsp. *minor* (Gregory) Valentine.

These two subspecies differ both in size of parts and in habitat, and may be distinguished as follows:

Leaves c. 30 mm. broad; flowers (14-) 20-22 mm.; sheltered habitats. subsp. *riviniana* [2218b]

Leaves 15-20 mm. broad; flowers 17-18 (-20) mm.; exposed habitats. subsp. *minor* [2218a]

113/9b *Viola palustris* L. subsp. *juressi* (Neves) P. Fourn. [2215a]

Any specimens of the species with spreading hairs on the petiole could be referred to this taxon. The petioles are always glabrous in subsp. *palustris*.

Subsp. *juressi* has so far been found mainly in the south of the British Isles.

115/6a & b *Hypericum maculatum* Crantz subsp. *maculatum* and subsp. *obtusiusculum* (Tourlet) Hayek

Robson (1957) has established the presence of two subspecies of *H. maculatum* Crantz (*H. dubium* Leers) in Britain and gives the following characters by which they may be distinguished:

Plant more slender, less branched; inflorescence rather strict, branches making an angle of c. 30° with the stem; leaves usually without pale glands, venation densely reticulate; sepals broad, entire; petals entire, marginal dark dots absent, superficial dark glands mainly in the form of dots. subsp. *maculatum* [1006a]

Plant stouter, more branched; inflorescence more spreading, branches making an angle of c. 50° with the stem; leaves more often with pale glands, venation laxer; sepals often narrower, eroded; petal-margins sometimes crenate, one or two marginal dots sometimes present, superficial dark glands mainly in the form of lines or dashes. subsp. *obtusiusculum* [1006b]

Subsp. *obtusiusculum* is much commoner than the type; the latter has, however, been found in Scotland, and similar material has been seen from two places in the south of England.

133/1b *Stellaria nemorum* L. subsp. *glochidisperma* Murb. [2014a]

This subspecies was reported in Britain by Green (1954), and the following key to its distinction from subsp. *nemorum* is based on his work and that of Lawalrée (1953):

Inflorescence-bracts decrease gradually in size at each dichotomy of the cyme; edge of *ripe* seeds with rows of short hemispherical tubercles; uppermost leaves sessile or subsessile. subsp. *nemorum*

Inflorescence-bracts reduced abruptly to small scales, the lower hardly or not transitional to leaves; edge of *ripe* seeds with rows of long cylindrical papillae c. 0·15 mm. long; uppermost leaves usually stalked. subsp. *glochidisperma*

Subsp. *glochidisperma* has been recorded in a number of Welsh counties.

168/16b & c *Geranium robertianum* L. subsp. *celticum* Ostenf. and subsp. *maritimum* (Bab.) H. G. Bak.

These two subspecies may be distinguished from the type by using the following key. (*G. purpureum* Vill. is included as there is sometimes confusion between this species and subspecies of *G. robertianum*).

1. Pollen yellow; petals 6-9 mm. *G. purpureum*
   Pollen orange; petals (8-) 9-12 mm. (*G. robertianum*) 2
2. Fruits ± glabrous; flowers small, petals usually less than 10 mm. Maritime shingle. subsp. *maritimum* [918b]
   Fruits ± hairy; flowers larger, petals 10-12 mm. 3
3. Plant dull deep-red in colour. Common. subsp. *robertianum* [918c]
   Plant pale green except at the nodes. Limestone rocks in the west, rare. subsp. *celticum* [918a]

For further details of these subspecies see Baker (1956).

169/3b *Erodium cicutarium* (L.) L'Hérit subsp. *dunense* Andreas [746b]

This subspecies may be separated from the type as follows:

Peduncles 3 (-4)-flowered, longest pedicel less than 13 mm.; petals rarely spotted; fruit 5-6 mm.; mature beak usually less than 25 mm. subsp. *dunense*

Peduncles 4-7-flowered, longest pedicel more than 15 mm.; petals often spotted; fruit ± 6 mm.; mature beak 25-40 mm. subsp. *cicutarium*

Subsp. *dunense* should not be confused with *E. glutinosum* Dumort. (q.v., page 361) which has small pale-pink or white flowers and is smaller in nearly all respects.

Subsp. *dunense* usually occurs near the sea whereas subsp. *cicutarium* is the more frequent inland.

188/1b *Sarothamnus scoparius* (L.) Wimm. subsp. *maritimus* (Rouy) Ulbr. (subsp. *prostratus* (C. Bail.) Tutin) [1822a]

This subspecies with prostrate stems, densely silky leaves and young twigs, occurs on cliffs in the west.
In subsp. *scoparius* the mature leaves are ± glabrous.

193/1 *Anthyllis vulneraria* L.

J. Cullen has kindly provided the notes and key for this species:

1 Calyx (4·5-) 5-7 mm. broad, with the lateral teeth obvious, not appressed to the upper teeth*. 2

Calyx 2-4·5 (-4·8) mm. broad, with the lateral teeth obscure, appressed to the upper teeth*. 3

2 Calyx with spreading shaggy hairs, grey-brown; stems usually few, 1-5 (-10). Mountains and hills, usually limestone; Scotland and N. Ireland.
subsp. *lapponica* (Hyland.) Jalas [126b]

Calyx with appressed silky hairs, yellowish-white; stems usually numerous, 10-30. Waste places, fields, etc.; common in S. England, becoming less frequent in the north. subsp. *vulgaris* (Koch) Corbière
var. *pseudovulneraria* (Sagorski) Cullen ined. [126c]

3 Stem with spreading shaggy hairs over its whole length; leaves fleshy, inserted in the lower part of the stem only. Maritime cliffs; known only from Anglesey, Cornwall and Sark.
subsp. *corbieri* (Salmon & Travis) Cullen ined. [126a]

Stem with appressed silky hairs over its whole length, or occasionally shaggily hairy in the lower part; leaves not very fleshy, evenly distributed along the stem.
(subsp. *vulneraria*) [126d] 4

4 Some or all of the petals red; plants small, up to 20 cm. Maritime cliffs; sporadic along W. coasts.
var. *vulneraria/coccinea* L.

All the petals yellow, except occasionally for a red tip to the keel; plants usually taller, robust, up to 60 cm. 5

5 Branches present in the axils of the upper leaves; undersides of lower leaves often densely hairy. Sand dunes; common, less frequent in the north.
var. *langei* Jalas

Branches absent from the upper axils; undersides of lower leaves sparsely hairy. Chalk and limestone; common, somewhat less frequent in Scotland.
var. *vulneraria*

*The calyx measurements refer to the flowers at anthesis;

measurements made later than this are misleading, as the calyx expands considerably in fruit. The character of the calyx teeth is difficult to use until one's eye is in.

Subsp. *vulgaris* var. *pseudovulneraria* is a Central European race which has been introduced into Britain; it seems to occur in small, short-lived populations, mainly near cultivated fields.

Subsp. *vulneraria* var. *coccinea* is restricted to Sweden (Öland & Gotland), but intermediates between it and var. *vulneraria* occur sporadically on the coasts of western Europe as far south as Anglesey (Aberffraw), and possibly also Pembroke and Cornwall.

234/1a *Malus sylvestris* Mill. subsp. *sylvestris* [1230b]

This subspecies may be recognised by the glabrous calyx and leaves, and the small fruits not exceeding 2·5 cm. in diam.

This appears to be native in woods and scrub in scattered localities throughout Britain.

314/1b *Daucus carota* L. subsp. *gummifer* Hook. f. [621]

This local subspecies can be separated from the common subsp. *carota* as follows:

Rays of umbel hispid; umbels flat or convex in fruit. subsp. *gummifer*

Rays of umbel glabrous or nearly so; umbels concave in fruit. subsp. *carota*

Intermediates exist, but subsp. *gummifer* is found on cliffs and dunes by the sea in the south and west.

343/11b *Salix caprea* L. subsp. *sericea* (Anderss.) Flod. [1788b]

This subspecies may be recognised by having leaves broadest above the middle, cuneate at the base, and thinly appressed unidirectional silky hairs above at maturity, not scattered or glabrous as in subsp. *caprea*. Subsp. *sericea* has been found in the Scottish Highlands.

430/4 *Veronica scutellata* L.

A very distinct variety of this species, var. *villosa* Schum., occurs occasionally, often in rather drier habitats than the type. It is densely long-pubescent. [2179a]

430/13b *Veronica serpyllifolia* L. subsp. *humifusa* (Dickson) Syme [2180a]

This subspecies may be distinguished from the type as follows:

Corolla white with slatey-violet lines; capsule shorter than sepals, sub-glabrous, with a few gland-tipped hairs at the apex. subsp. *serpyllifolia*

Corolla blue; capsule longer than sepals, densely ciliated with gland-tipped hairs. subsp. *humifusa*

Subsp. *humifusa* occurs quite widely in the mountains of the north and west.

436/1a and b *Odontites verna* (Bellardi) Dumort. subsp. *verna* and subsp. *serotina* (Wettst.) E. F. Warb.

These two subspecies are best separated as follows (after C.T. & W.):

All branches coming off at an angle of less than 45°; bracts longer than flowers. subsp. *verna* [1361b]

At least some of the branches spreading at a wide angle (often ascending at the tip); bracts shorter than or equalling the flowers. subsp. *serotina* [1361a]

Subsp. *verna* is rare in southern England but common in north Scotland; subsp. *serotina*, in contrast, is common in southern England and rare or absent in north Scotland.

485/8a and b *Galium palustre* L. subsp. *palustre* and subsp. *elongatum* (C. Presl) Lange

These two subspecies are best separated as follows (after C.T. & W.):

Leaves 5-10 mm.; flowers 3 mm. diam.; mericarps 1·2 mm. diam. Small plant of marshes or peaty areas with standing water in winter only. subsp. *palustre* [882b]

Leaves 15-20 mm.; flowers 4·5 mm. diam.; mericarps 1·6 mm. diam. Larger plant of reed-swamps, etc., usually in standing water. subsp. *elongatum* [882a]

506/8 *Senecio vulgaris* L.

Forms which have up to 8 shortly revolute ray florets occur occasionally, particularly in waste places in the south. Record as 'radiate form'. [1905g]

509/1 *Petasites hybridus* (L.) Gaertn., Mey. & Scherb.

The 'male' and 'female' plants of this species may be separated as follows (after C.T. & W.):

Heads 7-12 mm., with 0-3 female and 20-40 sterile 'hermaphrodite' florets. Inflorescence not markedly expanding in fruit. 'Male' [1447a]

Heads 3-6 mm., with c. 100 female and 1-3 sterile florets. Inflorescence expanding in fruit, exceeding 1 metre in height from May onwards. 'Female' [1447b]

The male plant is locally common throughout the British Isles. The female plant is not uncommon in the Midlands, but is rare or absent elsewhere.

552/1a *Tragopogon pratensis* L. subsp. *pratensis* [2074c]

This subspecies may be distinguished from the more common subsp. *minor* (Mill.) Wahlenb. by having pale yellow florets which almost or quite equal the pale-bordered involucral bracts. Rare, and mainly in the south-east.

636/1a and b *Gymnadenia conopsea* (L.) R. Br. subsp. *conopsea* and subsp. *densiflora* (Wahlenb.) G. Camus, Bergon & A. Camus

There is considerable overlap between these two subspecies which may be separated as follows:

Lower leaves broad, more than 15 mm.; some spikes exceeding 10 cm., dense; flowers bright-rose or magenta with smell of cloves. subsp. *densiflora* [948b]

Lower leaves narrow, less than 15 mm.; spike short, usually less than 10 cm., lax; flowers reddish-lilac, fragrant but not smelling of cloves. subsp. *conopsea* [948a]

Plants should not be determined unless a population of at least twenty specimens has been investigated.

Subsp. *conopsea* is found in base-rich grassland, particularly on chalk and limestone, whereas subsp. *densiflora* occurs in fens and marshes.

652/1 *Sparganium erectum* L. (*S. ramosum* Huds.)

Recent work by Cook (1961) has disclosed the presence of four subspecies in Britain. They are best recognised by the use of the key provided by Cook:

1. Fruit with distinct shoulder; upper part dark brown to black. 2
   Fruit with indistinct shoulder, spherical to ellipsoidal; upper and lower parts uniform, shiny, light brown. 3
2. Fruit large, (5-) 6-8 (-10) mm. long (excluding style), (3-) 4-6 (-7) mm. wide (at shoulder); upper part of fruit flattened. subsp. *erectum* [1981a]
   Fruit smaller, 6-7 (-8) mm. long, 2·5-4·5 mm. wide; upper part of fruit domed, wrinkled below style. subsp. *microcarpum* (Newm.) Hyland. [1981c]
3. Fruit ellipsoid, 7-9 mm. long, 2-3·5 mm. wide. subsp. *neglectum* (Beeby) Schinz & Thell. [1981b]
   Fruit ± spherical, 5-8 mm. long, 4-7 mm. wide. subsp. *oocarpum* (Celak.) C. D. K. Cook [1981d]

Subsp. *erectum* and subsp. *oocarpum* have been found only in southern Britain, north to the Wash; subsp. *neglectum* is also most common in the south but extends as far north as Westmorland; subsp. *microcarpum* occurs throughout the British Isles.

656/5b *Eleocharis palustris* (L.) Roem. & Schult. subsp. *microcarpa* Walters [675a]

This subspecies may be separated from subsp. *palustris* by reference to the following key (after Walters, 1949):

Ripe fruit (1·3-) 1·45-1·8 (-2·0) mm. long (excluding style base); middle glumes of spike 3·5-4·5 mm. long; glumes rather variable in colour, but usually brownish. subsp. *palustris*

Ripe fruit (1·1-) 1·2-1·4 (-1·5) mm. long; middle glumes of spike 2·75-3·5 mm. long; glumes rather pale, often light brown or straw-coloured. subsp. *microcarpa*

Subsp. *microcarpa* has been found in a number of counties in central and eastern England.

670/6b *Festuca rubra* L. subsp. *commutata* Gaudin [825b]

This subspecies may be separated from subsp. *rubra* and the closely related *F. ovina* L. as follows (after Hubbard, 1954):

1. Plants forming loose to dense mats, or with scattered shoots and culms; rhizomes present, very slender, extensively creeping. *F. rubra* subsp. *rubra*
   Plants densely tufted, without rhizomes. 2
2. Leaf-blades 0·3-0·6 mm. wide; lemmas tipped with an awn 0·5-1·5 mm. long; leaf-sheaths with free margins. *F. ovina*
   Leaf-blades 0·6-1 mm. wide; lemmas tipped with an awn 1-3 mm. long; leaf-sheaths tubular, with margins united, though soon splitting. *F. rubra* subsp. *commutata*

Subsp. *commutata,* besides being found as an escape from cultivation, is widely recorded in Britain, particularly on well-drained soils in the south.

HYBRIDS.

The following hybrids are frequent. Some are fertile and form swarms showing great variation due to back-crossing with either parent. Most of these can also be found in the absence of the parents. Those which are sterile do not usually occur without their parents, except for some aquatic species. Failure to produce good seed and/or pollen is often a sign of hybrid origin and this feature should be investigated when making a determination of a putative hybrid. The characters given below will assist in the detection of the hybrids concerned in the field but further study may be required for reliable determination.

102/2 × 1 *Rorippa* × *sterilis* Airy Shaw (*R. microphylla* (Boenn.) Hyland. (*Nasturtium microphyllum* (Boenn.) Reichb.) × *R. nasturtium-aquaticum* (L.) Hayek (*N. officinale* R.Br.)) [1349]

This hybrid resembles *R. microphylla* (q.v., page 360) in that the stem and leaves turn purple-brown in autumn. The pods are dwarfed and deformed, though some with 1 or 2 ripe seeds do occur. These seeds are intermediate in size and markings between those of the parents. *R.* × *sterilis* is a common plant in the north and west.

123/14 × 13 *Silene alba* (Mill.) E. H. L. Krause (*Melandrium album* (Mill.) Garcke) × *S. dioica* (L.) Clairv. (*M. rubrum* (Weigel) Garcke) [1260]

This hybrid can generally be recognised by its pink flowers, though in Orkney and Shetland it should not be confused with *S. dioica* var. *zetlandica* Compt. with flowers varying from light pink to dark crimson. The hybrid is also intermediate between the two parents in other characters. For further details see Moss (1920). Fertile. Common.

216/3 × 1 *Geum* × *intermedium* Ehrh. (*G. rivale* L. × *G. urbanum* L.) [923]

This hybrid is intermediate and should be looked for where the parents occur together. Fertile. Frequent.

247/2 × 1 *Drosera* × *obovata* Mert. & Koch (*D. anglica* Huds. × *D. rotundifolia* L.) [656]

This hybrid resembles *D. intermedia* Hayne but has a straight scape 2-3 times as long as the leaves arising from the centre of the rosette. Sterile. Occasional; especially in Scotland.

367/3 × 5 *Primula* × *variabilis* Goupil, non Bast. (*P. veris* L. × *P. vulgaris* Huds.) [1606]

Very variable. The commonest form of this hybrid differs from *P. veris* in having leaves not contracted at the base, and larger, paler yellow flowers. Fertile. Frequent.

392/2 × 1 *Symphytum* × *uplandicum* Nyman (*S. asperum* Lepech. × *S. officinale* L.) [2025]

This hybrid is widespread and often occurs, probably as an introduction, in the absence of either parent. For further details see under *S. officinale* (page 365). Fertile.

420/3 × 4 *Linaria* × *sepium* Allman (*L. repens* (L.) Mill. × *L. vulgaris* Mill.) [1162]

This hybrid may be distinguished from *L. repens* by the larger corolla (12 × 21 mm. as against 7-14 mm.), usually yellowish, striped with violet, and the broader leaves of the flower-bearing stems (mainly more than 2 mm., as against mainly less than 2 mm.). Partially fertile. Locally common where parents occur together.

445/4 × 3 *Mentha* × *verticillata* L. (*M. aquatica* L. × *M. arvensis* L.) [1286]

Differs from *M. arvensis* in having calyx-teeth twice as long as broad, upper bracts sometimes shorter than the flowers and by the hairy pedicels, from *M. aquatica* by the leafy inflorescence, and from both parents in having stamens normally not exserted. Sterile. Common throughout the British Isles.

445/4 × 5 *Mentha* × *piperita* L. (*M. aquatica* L. × *M. spicata* L.) [1279]

Differs from *M. aquatica* by having a terminal oblong spike-like inflorescence and glabrous pedicels, from *M. spicata* by its petiolate leaves (more than 3 mm.) and from both parents in having stamens not exserted. Sterile. Locally common throughout the British Isles.

459/6 × 7 *Stachys* × *ambigua* Sm. (*S. palustris* L. × *S. sylvatica* L.) [1999]

This hybrid may be recognised by its linear-lanceolate shortly-petioled lower leaves, which are 2-4 times as long as broad, and broadest about the middle. Sterile. Not uncommon throughout the British Isles, and sometimes in the absence of *S. sylvatica,* e.g. in the north and west.

469/1 × 2 *Scutellaria* × *hybrida* Strail (*S.* × *nicholsoni* Taub.) (*S. galericulata* L. × *S. minor* Huds.) [1872h]

This hybrid has the remotely and shallowly crenate leaves of *S. galericulata* and the small flowers (less than 10 mm.) of *S. minor.* Occasional.

N.B. *S. minor* usually has one tooth at the base of the lower leaves.

506/2 × 1 *Senecio* × *ostenfeldii* Druce (*S. aquaticus* Hill × *S. jacobaea* L.) [1891h]

The following note has been provided by D. H. Kent:

Resembles *S. aquaticus* in having large terminal leaf lobes and a few-flowered corymb, and *S. jacobaea* in the much cut upper leaves. The fruits are usually hispid. Partially fertile.

Probably widespread wherever the two parents occur together which happens more frequently in the west and north.

605/9 × 8 *Juncus* × *diffusus* Hoppe (*J. effusus* L. × *J. inflexus* L.) [1065]

The inflorescence of this hybrid resembles *J. inflexus,* but the plant differs from that species in having green, not glaucous, scarcely grooved stems, with 18-45 coarse striae. Sterile. Probably rather rare but widespread.

606/2 × 1 *Luzula* × *borreri* Bromf. (*L. forsteri* (Sm.) DC. × *L. pilosa* (L.) Willd.) [1200]

Resembles *L. pilosa* but is often taller, with fewer, spreading inflorescence-branches. The capsule is much shorter than the perianth.
Sterile. Frequent within the range of *L. forsteri.*

669/1 × 2 *Glyceria* × *pedicellata* Townsend (*G. fluitans* (L.) R.Br. × *G. plicata* Fr.) [935]

This hybrid may be distinguished from its two parents by the intermediate length of the lemma (5-5·5 mm.), and the anthers (1·2-1·5 mm.) which are indehiscent. Sterile, but spreads vegetatively and may therefore be found in the absence of either parent. Frequent throughout the British Isles.

670/1 × 671/1 × *Festulolium loliaceum* (Huds.) P. Fourn. (*Festuca pratensis* Huds. × *Lolium perenne* L.) [815]

Spikelets resemble *F. pratensis* but are more compressed, and sessile in a simple or somewhat branched raceme. Glume next to the axis usually present. Sterile. Widespread.

I am most grateful to the following people who have read through the manuscript and have made many useful comments and amendments for the improvement of these notes: D. H. Kent, J. E. Lousley, Professor T. G. Tutin, Dr. S. M. Walters and Dr. E. F. Warburg. I am also indebted to those many others who have generously supplied notes and keys, and whose names are mentioned in the text.

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FURTHER NOTES ON VERONICA FILIFORMIS

By E. B. Bangerter and D. H. Kent

Since the publication of our paper on *Veronica filiformis* in the British Isles (Bangerter & Kent, 1957) a number of additional facts have been discovered and many more records accumulated; these are brought together in the present paper.

Methods of Reproduction

In our previous paper we mentioned that we had seen fruiting material of *V. filiformis* from only Hampshire and Kent; since then we have seen specimens from N. Devon, 2 capsules (coll. R. G. B. Roe); S. Somerset, 3 capsules each containing a single seed (coll. J. B. Marshall); Surrey, three localities, each producing 1 capsule (coll. F. D. S. Richardson and Mrs. J. E. Smith); N. Essex, 1 capsule (coll. J. Bevington-Smith); Buckinghamshire, 1 capsule (coll. W. D. Delderfield); Cambridge, 2 capsules (coll. K. M. Blades), Lanark, 1 capsule (coll. E. B. Bangerter & Mr. and Mrs. P. C. Hall), and Haddington, 1 capsule (coll. M. McCallum Webster).

Flowering Period and Growth

The normal flowering period of *V. filiformis* is April-June, rarely as late as August. D. E. Kimmins, however, reports that he noted the species in flower at Landulph, E. Cornwall, on 9th November 1957.

During 1957 Mrs. J. Oldaker sent us specimens from Culmstock, S. Devon, containing small growths in some of the leaf-axils, and suggested that they may be sessile cleistogamous flowers. After a detailed examination of the material we reached the same conclusion.

In the same year, Mrs. J. E. Smith, of Claygate, Surrey, gave a small piece of the plant from her garden to one of us (E.B.B.); the specimen was in a poor state, having been subjected to weed-killer in an attempt to eradicate it. Transplanted to a north London garden it very soon revived and has thriven since. The plant has been cut back each year, though it has been noted that a circular patch of about nine inches diameter will attain a diameter of three feet in seven to eight months. Attempts by the other author (D.H.K.), however, to cultivate the plant in his west London garden have been unsuccessful, for though it thrives for a short time it will not survive over winter. D. McClintock tells us that he has experienced similar difficulty in attempting to grow the species in his garden in West Kent.

FLOWER COLOUR

The colour of the flowers of *V. filiformis* that we have seen from many parts of the British Isles has been of a uniform pale blue. Touton (1943), however, draws attention to a colour-form from France in which the corolla is of a deep violet-blue, somewhat like the colour of the flower of *V. chamaedrys,* with which species it often grows.

EUROPEAN RECORDS

FRANCE. Fournier (1959), outlines the history of the species in France, while Bouby & Rouet (1959), record that it has spread considerably in the Paris area in recent years. Corillion (1960) reports that in western France it has been usually recorded from lawns, public parks, near cemeteries and the like, though in many European localities it is known from meadows. He records it for the first time from such a locality at St. Jean-sur-Erve, Mayenne.

NETHERLANDS. Clason (1959), discusses the introduction of the species into the Netherlands, and Van Ooststroom (1959 & 1960), gives an account of the distribution and spread in that country.

GERMANY. Touton (1943) shows that the species was known in Bavaria as early as 1920.

SWITZERLAND. Becherer (1960) gives many additional records for Switzerland.

CZECHOSLOVAKIA. Soják & Sourek (1959), report the occurrence of *V. filiformis* as an established garden escape in various parts of Czechoslovakia. It was noted first in Eastern Bohemia in 1941, and during 1947 was found near Prague. In 1952 it was recorded from Southern Bohemia. The spread in the country is further discussed by Jehlik (1961), and the distribution shown by means of a map.

DENMARK. Hansen (1957) reveals that *V. filiformis* is still spreading in Denmark, and that it is now known to be established in about 250 localities.

FINLAND. Jalas (1956) records that the species has been cultivated in some gardens in southern Finland during the last 30 years. In the market garden area of Jylhä (province of South Savo) it thrives well and has shown some inclination to be a garden escape. It grows, also, in some market gardens in the vicinity of Helsinki. *V. filiformis* does not endure the Finnish climate well enough to become a weed as in some other European countries.

Cedercreutz (1958), Hyvämäki (1960) and Roos (1961) give further data on the plant in Finland.

AMERICAN RECORDS

CANADA. Gillett (1958) cites *V. filiformis* as being established in the Ottawa district.

V. FILIFORMIS AS A BRITISH ADVENTIVE

In our previous paper we gave the earliest date of the occurrence of *V. filiformis* as an established garden escape in the British Isles as 1927. An overlooked reference (*The Nat.*, **4**, 56 (1838)), however, shows that it was in fact first noted nearly 90 years earlier, and also claimed as a native plant, viz.—"During the past month a plant, hitherto unknown as a native of Britain, was found in the neighbourhood of Colchester, where a number of specimens have been gathered. This flower, the Filiform Speedwell (*Veronica filiformis*), is a native of the Levant, and was introduced into England in 1780. The blossoms are of a pale blue colour, on long slender flower-stalks, and it partakes of the habit of the common Germanders (*Veronica chamaedrys* and *V. arvensis*). The situation in which it was found clearly proved that it was of spontaneous growth, and the discovery is a truly valuable addition to the British flora".

V. filiformis is not, of course, a native of these islands, and this Essex record was undoubtedly the result of an early garden escape; it is nevertheless curious that the species was not recorded again until 1927.

Further studies on the distribution of the plant have confirmed our earlier conclusions that it is most frequent in southern and western England. In northern England and Scotland it has proved to be more widespread than we suspected, but in the latter country Miss E. P. Beattie informs us it is rarely found far from human habitation.

Figure 1 shows the known distribution of the species in 1961, not only as an established escape, but also as a garden weed and lawn pest.

The known British and Irish vice-comital distribution of *V. filiformis* as an established escape should now read: 1-31, 33-90, 92-101, 103-105, 107-109, 111 & 112. H. 1-5, 7-13, 16, 20, 21, 26-28, 30, 33-35, 37-40. S.

BRITISH AND IRISH RECORDS

The following list gives records additional to those cited by Bangerter & Kent (1957), including details from herbarium specimens examined*. The abbreviations used for herbaria are those given by Kent, Bangerter & Lousley (1958).

CHANNEL ISLANDS

GUERNSEY: rubbish-tip by Vale Castle, 1957, *H. J. M. Bowen*. George Road, Guernsey, 1958, *G. W. Coxhead*. By stream in Fermain Bay, and up a cliff path to the north, *M. English & D. McClintock*; roadside near Les Hubits, *D. McClintock* (McClintock, 1959).

SARK: at the Seigneurie, in long grass under trees, *Mrs. F. Le Sueur* (McClintock, 1959).

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*Additional records (and specimens) would be much appreciated, and should be sent to either of the authors.

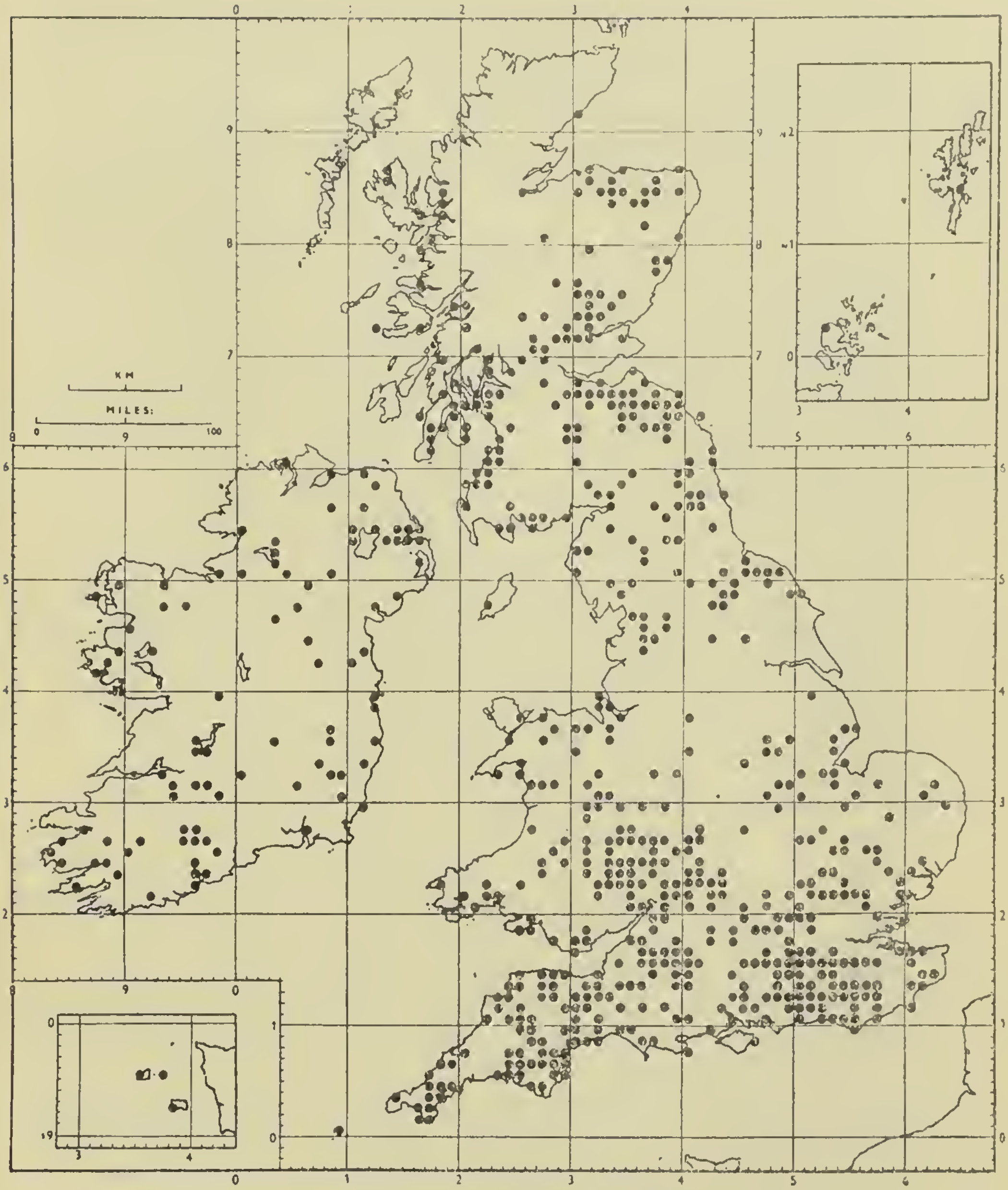

FIG. 1.—Distribution of *Veronica filiformis* Sm. in the British Isles, 1961.

V.c. 1. W. Cornwall: Landewednack Churchyard, The Lizard, 1957, *K. E. Bull*; 1959, *E. G. Ing*. Roadside near cottages, Trencrom, near Lelant, 1959, *E. G. Ing*. Pest of lawn, Cusgarne, near Gwennap; garden weed, Percuil; Roskear, near Camborne, 1961, *Miss J. Allison*.

2. E. Cornwall: edge of Carne quarry, near Portloe, c. 1950, *M. E. Barnsdale*, comm. *R. W. David*. Bank around the vicarage, Landulph., Tamar estuary, 1957, *D. E. Kimmins*. Dry bank, Polrode, near St. Teath, 1957, *R. I. Sworder*. Budorne Eglos, near Wadebridge, very abundant on grassy verges of a lane for 100 yards, 1957, *R. W. David*.

3. S. Devon: Staverton; roadside near houses, Hillhead, Brixham, 1950; Ilsham Road, Torquay, 1955; Galmpton; Marlborough; Churston Ferrers; Churston Golf Course, plentiful, *F. M. Day*. Severe pest of lawns, Culmstock, near Cullompton, 1957, *Mrs. J. Oldaker*. Knowle Down, between Harrobridge and Walkhampton, roadside above bracken-covered moorland slope, 1957, *B. Welch, J. F. & P. C. Hall* (BM). River bank, Hamworthy Bridge, 1957, *B. Welch, J. F. & P. C. Hall* (BM). Farway, near Honiton, pest of lawns; Haytor Rocks Hotel, pest of lawns, 1957, *Miss V. M. Leather*. Sidmouth, by western edge of footpath along cliff-top east of river Sid, 1957, *F. D. S. Richardson*. Stream at sea-front, Branscombe, plentiful; cliffs west of Budleigh Salterton, 1959, *K. E. Bull*. Bovey Tracey; Knowle, roadside south of river Bovey bridge (Greig, 1960). Between railway and river Otter, north side of Otterton Bridge, *Mrs. V. M. Wilkinson* (Greig, 1961).
4. N. Devon: Highampton, well established on hedgebank near a farm cottage, 1957; Jacobstowe Churchyard, 1957, *R. G. B. Roe*. South Tawton (in fruit), 1957, *R. G. B. Roe* (BM). Combe Martin, 1946→, *Miss S. M. Parker*, comm. *D. McClintock*. Milton Damerel, roadside near Woodford Bridge; Okehampton, roadside by Army railway siding (Greig, 1960). Barnstaple, sports ground, *Miss A. N. Richards*; by river Taw, near Mill, *O'N.R.*; Coldridge, by river Taw west of Park Mill bridge, *O. Greig* (Greig, 1961).
5. S. Somerset: between Catcott and High Wood, *E. J. Hamlin, Proc. Som. Arch. & N.H.S.*, **98**, 136. Huntscott, Wootton Courtney, *A. D. & O. M. Hallam, Proc. Som. Arch. & N.H.S.*, **101 & 102**, 136. Selworthy Green, Selworthy, abundant in grass verges and turf of adjacent gardens, 1958, *J. B. Marshall* (BM). Culbone Churchyard, near Porlock, abundant, 1961, *J. E. Lousley*.
6. N. Somerset: between Brassknocker and Dundas Aqueduct, in a field, 1947, *E. H. Lubbock*, comm. *Miss E. H. Stevenson*. Abundant on a wall south-east of Bathford, 1957, *Miss E. H. Stevenson*. Wadbury Valley, near Frome, plentiful, 1957, *Mrs. N. Wycherley* (BM). Bath, pest of lawns, 1957; grassy bank, Kilmersdon, 1957, *R. G. B. Roe*. Orchardleigh and Hemington Churchyards, north of Frome, *P. F. Hunt* (Sandwith, 1961).
7. N. Wilts: grassy bank, Kingsdowne, near Box, 1956, *J. O. Ballard*. Colerne Park, near Bath, a small patch, far from houses, 1957, *T. G. Collett*. Roadside, Colerne, 1958, *D. Frowde, Wilts. Arch. & N. H. Mag.*, **57**, 290. North Bradley Churchyard, 1960; water meadow, Ford, 1960, *T. G. Collett*. Doncombe Meadow, *G. W. Collett*; Marlborough, *F. M. Day* (Grose, 1961).
8. S. Wilts: banks of stream by bridge, Salisbury Road, Landford, 1952, *R. P. Bowman*. Ham, *F. Partridge*; East Knoyle, Stratton (Grose, 1961).
9. Dorset: several places at the roadside, near Blandford, 1956, *F. M. Day*. Garden lawn, Woodbridge Mill, Fontmill Magnus, 1960, *E. Milne-Redhead*.
10. Isle of Wight: Sandown, pest of lawn, 1957, *Miss L. M. Webb*, comm. *E. Milne-Redhead*.

11. S. Hants: banks of stream in meadows. Test Valley, Lee, near Romsey, 1952; near Rownham's Church, abundant on lawns, 1953→; in fair quantity in a few places on shingle banks and wooden breakwaters, river Test above and below Nursling Mill, 1953; bank of small tributary stream, Lymington river, Brockenhurst Bridge, 1955→, *R. P. Bowman*. Lawn weed, Totton, 1960, *C. J. Vardy* (BM).

12. N. Hants: the record for Ewshott, Farnham, 1956, *Miss V. M. Leather* (*Proc. B.S.B.I.*, **2**, 207) is in v.c. 12 not v.c. 17. Grassy verge outside church wall, Martyr Worthy, Itchen Valley, Winchester, 1953-1954; The Wakes, Selborne, garden pest, *R. P. Bowman*. Basingstoke, garden pest; Mapledurwell, south of Basingstoke, 1957, *Miss V. M. Leather*. Bank of lane near Dogmersfield, Sprat's Hatch, 1958, *E. Milne-Redhead*. Garden pest, Alton, 1960, *M. Cleaver*, comm. *D. McClintock*. Roadside bank by houses, Hunnington, 1957; Eversley Churchyard, 1958; runnel in Selborne, 1960, *W. E. Warren*.

13. W. Sussex: Day (1960) reports that in parts of Sussex *V. filiformis* has been given the name "Blue Devil". Near "The Black Rabbit", Arundel, a large patch among grass, 1946, *B. T. Lowne* (K); 1960, *H. C. P. Smail*. Garden weed, Ansty, 1957, *T. Wooddisse* (BM). Northchapel Churchyard, abundant, 1957, *Mrs. B. Welch*. Ferring, near Worthing, garden pest, 1959, *Miss C. Cracknell*, comm. *E. Milne-Redhead*. A pest in many Worthing gardens, 1960, *H. C. P. Smail*, comm. *D. McClintock*. Roadside bank near house below Blackdown, 1949, *W. E. Warren*.

14. E. Sussex: edge of ditch in field behind Arlington Churchyard, 1957, *D. P. Young*. Hedgebank near farm, Maresfield, 1957, *F. Rose*. Brede, *Miss J. Winch, Hastings & E. Sussex Nat.*, **8**, 234. Rampant weed under a shrubbery, Stonegate, on the crest of one of the numerous east-west Wealden ridges, the subsoil is Ashdown Sand of the Hastings Beds, 1957, *J. Rogerson*. By roadside, Chailey Common, far from houses, 1958, *H. P. C. Smail*, comm. *D. McClintock*. Jevington Churchyard; Lordswell Lane, Crowborough, abundant; Etchingham Churchyard, 1959, *K. E. Bull*. Ardingly, 1958, *F. D. S. Richardson* (BM). Sulgrove House, Crowborough, 1960, *D. McClintock*. The Beacon, Hassocks, 1960, *W. Howell*, comm. *D. McClintock*. Clayton Churchyard, 1960; garden weed, Haywards Heath, 1960, *Miss M. Songhurst*.

15. E. Kent: bank of river Stour, Sturry, near Canterbury, a small patch in rough turf, 1954, *Mrs. J. Oldaker*. Seasalter and Whitstable, pest of lawns, 1955, *H. Wilks*. Roadside bank, Whitstable, 1955; 1957, *H. Wilks* (BM). Dover, 1957, *Mrs. Rowlands*, comm. *D. McClintock*. Ashford, garden weed, 1960, *Mrs. N. E. Baker*, comm. *D. McClintock*. Bethersden, 1960, *Mrs. D. E. Keel*, comm. *D. McClintock*.

16. W. Kent: hedgebanks and meadows west of Sevenoaks Church, 1957, *F. Rose*. Vegetable garden, Brasted, 1957, *J. F. & P. C. Hall*. Basted, near Borough Green, 1958, *D. McClintock*. Waste ground, Eden Park, Beckenham, 1960, *J. T. Carter*, comm. *D. McClintock*.

17. SURREY: Haste Hill, Haslemere, in fair quantity on road verges near cottages, 1953, *R. P. Bowman.* Church Lane, Godstone, 1955; Drivers Green, Outwood, 1955; near Oxted Mill, by stream and in a field, plentiful, 1955; South Nutfield, bank outside garden of house, 1956; field beside Holmesdale footpath, Nutfield, 1957, *Miss B. A. Kneller.* South-west corner of White Bushes Common, a large patch, 1957, *F. D. S. Richardson* (BM). Claygate, pest of lawns and flowerbeds, 1957, *Mrs. J. E. Smith* (BM). Forest Hill, pest of lawns, 1958, *Mrs. L. M. P. Small.* Holmwood Common, 1959, *D. E. Allen.* Garden pest, Banstead, 1960, *R. S. R. Fitter.* Holly Hill, north of Ewhurst, 1960, *D. McClintock.* Near Riddlesdown station; near Upper Warlingham station, 1960, *K. E. Bull*: near Park Downs, 1960, *Mrs. L. M. P. Small* (Lousley, 1961). Lawn pest and cemetery at Farnham, 1949→; Pirbright Churchyard, 1961, *W. E. Warren.* Ashtead Churchyard, abundant, 1961, *B. Welch.*
18. S. ESSEX: Coxtie Green, Brentwood, pest of lawns, 1958, *P. J. Wanstall.*
19. N. ESSEX: Colchester, 1838, *The Nat.*, **4**, 56; frequent pest of lawns since *c.* 1935, *P. Bevington Smith;* 1957 (BM). Grassy verge, Shearing Place, 1958, *J. F. & P. C. Hall.*
20. HERTS: road bank, Loudwater, near Rickmansworth, 1957, *G. W. & T. G. Collett.* Golf course, Moor Park, Rickmansworth, 1957, *F. M. Day.* Bishops Stortford College, 1959, *D. McClintock.* Totteridge, pest of lawns, 1959, *D. McClintock.* Roadside verge, Boxmoor, Hemel Hempstead, 1960, *R. B. Benson* (BM). Rubbly path verge outside garden, East Barnet, 1961, *J. F. & P. C. Hall.*
21. MIDDLESEX: Sunbury-on-Thames, abundant by path near river Thames, 1957, *D. H. & M. P. Kent* (BM). Harefield Moor, by river Colne, 1958, *I. G. Johnson & B. P. Pickess.* Garden pest, Eastcote, 1960, *T. G. Collett.* West Drive, Harrow Weald, abundant on road verges, 1960, *Mrs. L. M. P. Small.*
22. BERKS: Eastbury, near Newbury, garden weed, 1957, *A. Conolly.* Maidenhead, on the artificial island between the natural course of the river Thames and the navigation channel through Boulter's Lock; well established in lawns along the bank of the river, 1957, *J. Rogerson.* Grass verge between High Bridge and Blacknest Gate, Virginia Water, abundant, 1957, *W. E. Warren.* Old mill, Aldermaston, *Mrs. Simmonds* (Butler, 1962).
23. OXFORD: grassy bank at Wolvercote end of Port Meadow, *J. P. M. Brenan, Rep. Bot. Soc. & E.C.*, **13**, 229 (1948). Oxford Botanic Garden, abundant weed of turf, 1961, *D. H. Kent.* Among grass on river bank between Iffley and Sandford; Ashford Bridge, near Stonesfield, 1961, *Miss J. D. Butler & P. G. Sheasby.* Garden weed, Towersey, 1961, *R. S. R. Fitter.* Bridle path, Mapledurham to Whitchurch (Butler, 1962).
24. BUCKS: Chesham Bois, abundant garden weed, 1957, *J. Rogerson* (BM). Penn, garden pest, 1957, *H. C. Holme.* Monk's Risborough and Meadle, garden pest, 1957, *P. D. MacLagan* (BM). Mat forming in grass in several places by the river Thames between

Marlow and Bourne End, 1957, *F. Ambrose* (Hyde, 1958). Roadside near Whiteleaf, Princes Risborough, 1958, *Mrs. R. C. May*, comm. *Mrs. B. Welch.* Near Owlswick, near Princes Risborough, 1958; roadside verge by Hartwell House, Aylesbury, *R. A. Graham & R. C. Harley.* Bank of river Colne, Harefield Moor, 1958, *I. G. Johnson & B. P. Pickess.* Garden weed, Radnage, 1960, *R. S. R. Fitter.* Waddesdon Manor, rampant in some lawns, 1960, *J. Rogerson.* Garden weed, Hughenden valley, High Wycombe, 1960, *R. D. Lovett*, comm. *D. McClintock.* Rough ground, Cobbler's Hill, Great Missenden, 1960; garden and lawn weed, Little Hampden, 1960, *W. D. A. Delderfield* (BM).

*26. W. SUFFOLK: lawn near Brandon Bridge, Brandon, 1957, *K. E. Bull.* Grassy verge, Stradishall Place, 1958, *J. F. & P. C. Hall.*

27. E. NORFOLK: lawn pest, Horning, near Wroxham, 1960, *J. Rogerson.*

28. W. NORFOLK: lawn at Burnham Overy Staithe, 1959, *K. E. Bull.*

29. CAMBRIDGE: roadside, Bourne, near Great North Road, 1957, *K. E. Bull.* In and around Hibbert Ware Memorial Garden, Girton, 1959, *K. M. Blades* (CGE).

30. BEDFORD: Chalgrove Manor, lawn weed, 1958, *J. H. Chandler.*

*31. HUNTINGDON: Hemingford Grey, *P. J. Bourne.*

33. E. GLOUCESTER: King's Stanley, garden pest, 1957, *Miss E. H. Stevenson.* Miserden Park, north-east of Stroud; Miserden Churchyard, 1957, *D. McClintock.* Bussage, 1957, *F. D. S. Richardson.*

34. W. GLOUCESTER: Huntingford Mill, Charfield, *G. W. Garlick, Proc. Bristol Nat. Soc.*, **29**, 347.

35. MONMOUTH: Llanthony Abbey, abundant in lawns, 1959, *E. Milne-Redhead.*

36. HEREFORD: Brock Hill, Colwall, 1946→; several localities at Colwall, 1950→; Bearswood Common, 1953; bank of river Wye below Caple Hill, 1956, *F. M. Day.* Road to Broadmoor Common, Cradley, 1947, *F. M. Day;* Breinton; Hampton Bishop, *Mrs. L. H. Whitehead;* Sutton Walls, 1955, Dulas (Kendrick, 1957). Barr's Court, Tarrington, pest of lawn, 1957, *D. McClintock.* In two or three places on the right bank of the river Wye, close to Moccas Bridge, 1958; lane close to houses, Little Doward, 1958, *R. S. R. Fitter.* Pixley Court, Ledbury, 1960, *E. M. Thompson*, comm. *D. McClintock.*

37. WORCESTER: spreading along the road into the parish of Mathon, Herefordshire (v.c. 37), 1950; Newland Green, 1956, *F. M. Day.*

38. WARWICK: weed in gardens, Bilton Road, Rugby, *Mrs. M. D. G. Jones* (Allen, 1961).

39. STAFFORD: roadside verge, Denstone, *E. S. Edees, Trans. & Ann. Rep. N. Staffs. F.C.*, **90**, 61. Yoxall; in the churchyard at Newchurch; Stowe; Chartley Castle, 1959, *E. S. Edees, Trans. N. Staffs. F.C.*, **93** & **94**, 77 (1960).

40. SALOP: Church Stretton, abundant in the grass verge of a suburban road, well inside the town area, 1958, *J. Ranson.*

41. GLAMORGAN: Nottage Court, Porthcawl, 1960, *R. C. Howell* (BM). Grassy roadside near Cefn Onn Halt, 1959, *A. E. Wade* (NMW; Wade, 1961).

44. CARMARTHEN: Gwavas, Ferryside, garden weed, 1957; Ferryside, top of stone wall and colonising grassy bank in wet field, 1957, *R. F. May* (BM). Field near Llandovery, 1957, *Miss M. H. Bigwood.* Banks of the river Taf, Whitland, 1960, *J. W. Donovan, Nature in Wales,* **7**, 67 (1961).

45. PEMBROKE: [banks of the river Taf, Whitland, 1960, *J. W. Donovan, Nature in Wales,* **6**, 136 (1960). This record refers to Carmarthen, *Nature in Wales,* **7**, 67 (1961)]. Well-distributed in woodland at the Kensington Hospital, St. Brides, 1961, *T. A. W. Davis, Nature in Wales,* **7**, 67 (1961).

48. MERIONETH: Dolgellau, 1960, *Miss J. D. Butler* (BM).

49. CAERNARVON: hedgebank, Roe Wen, near Conway, 1957, *R. Lewis* (NMW). Side of lane near houses, Sarnbâch, near Abersoch, Lleyn peninsula, 1957 (Conolly & Smith, 1957). Pont Rhyd-hir, spreading from farm for about 110 yards over meadows towards the river, *Miss A. P. Conolly* (Benoit, 1962).

50. DENBIGH: near Mold, 1957, *Miss M. H. Bigwood.*

51. FLINT: frequent along the Alyn from Llandegla to Rhydymwyn, also at intervals along the Clwyd, Proc. *Liverpool N.F.C.*, **1956**, 9. Meadow near Llanferres, 1960, *Liverpool Botanical Society Field Meeting.*

52. ANGLESEY: streamside on the edge of Malltraeth Marsh, below Llanfawr, well established, *R. H. Roberts, Nature in Wales,* **5**, 792 (1959).

*53. S. LINCOLN: lane side, Whaplode Drove, 1957; garden weed, Stubton, 1957, *R. C. L. Howitt.*

54. N. LINCOLN: two corrections have to be made for records from this vice-county cited in our previous paper (Kent & Bangerter, 1957). For "Reverley Bridge" read Revesby Bridge, and for "Market Drayton" read Market Rasen.

*55. LEICESTER: field near Wartnaby Church; roadside, Stockerstone, in quantity, 1957, *E. K. Horwood*; 1958, *J. Laundon* (BM). Noseley Hall, Billesdon, pest of lawns and paths, 1957, *D. McClintock.*

55. (RUTLAND): Whissendine Churchyard, 1956, *R. C. L. Howitt.* Cottesmore Rectory, pest of lawns and garden, 1957, *J. H. Chandler.*

56. NOTTINGHAM: Thrumpton Churchyard, 1956; Epperstone, garden weed, 1957, *R. C. L. Howitt.*

*57. DERBY: Buxton, weed of allotments, etc., for over ten years, 1957, *F. T. Hall* (BM).

58. CHESTER: first observed at Bromborough in 1950, has spread rapidly along the Dibbin, and occurs also in large swards in some of the adjacent meadows, Ness, *J. P. Savidge, Proc. Liverpool Nat. F.C.*, **1956**, 19.

61. S.-E. YORK: roadside, Bewholme, Holderness, competing with native vegetation, 1957, *Miss J. Allison*; 1959, *Miss J. Allison* (BM). Verge and ditch bank near Hornsea, 1959, *Miss J. Allison* (BM). Eastgate, garden weed, 1959, *Miss J. Allison* (BM).

62. N.-E. YORK: roadside, Kepwick; river bank, Maunby, very abundant, 1957, *Miss C. M. Rob.* Hutton-le-Hole, 1958, *J. E. Duncan, The Nat.*, **1959**, 26. Forming dense mats on a lawn in a garden at Osmotherley, *J. W. Heslop-Harrison, The Vasc.*, **46**, 15.

63. S.-W. YORK: bank of river Hodder, Slaidburn, *F. Elliman*, comm. *F. Murgatroyd, The Nat.*, **1961**, 26. Hedgebank, Ripon Canal, Littlethorpe, 1957, *Miss C. M. Rob.*

65. N.-E. YORK: grassy bank near garden, Whaw, Arkengurthdale, 1957; Patrick Brompton Churchyard, Bedall, abundant in short turf, 1958, *Miss C. M. Rob.*

66. DURHAM: a path at the lower end of Castle Eden Dene, some hundreds of yards from any houses, 1957, *R. S. R. Fitter.*

67. NORTHUMBERLAND S.: Wylam, 1936; near Cateleugh, 1958; banks of river Coquet from Harehaugh down to Paperhaugh, 1958, *G. A. Swan.* Corbridge Cemetery, abundant in short turf, 1958, *Miss C. M. Rob.* Bellases Bridge, Stannington, 1958, *R. C. L. Howitt* (BM). Kirkwhelpington, on grass verge by churchyard wall, 1958, *E. B. Bangerter, F. H. Perring & G. A. Swan* (BM). On the shingle along the Wear near Wolsingham, *J. W. Heslop-Harrison, Vasc.* (*Subst.*), **43**, 15.

68. CHEVIOTLAND: Breamish, near Brandon, 1958; north bank of river Coquet, *G. A. Swan*; 1958, *E. B. Bangerter, Cmdr. R. G. B. Roe & Mrs. Roe* (BM). Ingram Churchyard, 1958, *D. McClintock.*

70. CUMBERLAND: abundant and increasing in many places in the Eden Valley (Stalker, 1957).

72. DUMFRIES: river bank, Hoddom Bridge, thoroughly naturalised, 1957, *R. C. L. Howitt.* On shingle of river Annan, Dryfeholme, between Lochmaben and Lockerbie, 1957, *E. B. Bangerter & T. G. Collett* (BM).

74. WIGTOWN: Leswalt area, *R. Prasher.* Garden pest, Logan House, Port Logan, 1960, *R. S. R. Fitter.* Port William, ex *B.S.B.I. Maps Scheme.*

75. AYR: by river Doon, Allowey, south of Ayr, in several places, 1957, *D. McClintock.* Ballantrae; Colmonell; Gervain, *R. Prasher.* Crosshill; Kilmarnock; Auchendrane Estate; Barhill; Dailly; Kirkoswald; Skelmorlie Water; Dunure, ex *B.S.B.I. Maps Scheme.*

76. RENFREW: Newton Mearns, Glasgow, 1960, *G. R. Sloman*, comm. *D. McClintock.* Kilmacolm, ex *B.S.B.I. Maps Scheme.*

77. LANARK: derelict garden, Gilkerscleugh House, between Abington and Crawfordjohn, 1957, *E. B. Bangerter, J. F. & P. C. Hall* (BM). Culter; Carluke; Tinto, ex *B.S.B.I. Maps Scheme.*

78. PEEBLES: small patch by roadside at Bridge-end, Dolphinton, *Miss E. P. Beattie.*

79. SELKIRK: grassy bank near houses, Clevenfords, 1956, *Miss E. P. Beattie.*

*80. ROXBURGH: Bowmont at Yetholm, 1957, *G. A. Swan.* Railway bank near Riccarton, 1960, *Miss C. M. Goodman & J. G. Dony* (BM). Near Kelso, 1960, *Miss E. M. C. Isherwood* (BM).

81. BERWICK: grassy bank near houses, Lauder, 1956; small clump by river Whiteadder, Abbey St. Bathans, 1958, *Miss E. P. Beattie.* Road near Duns, 1960; *Miss E. M. C. Isherwood* (BM). Longformacus, ex *B.S.B.I. Maps Scheme.*

82. HADDINGTON: by the river below Bail House, near Stenton, three colonies in grass; Aberlady, 1956; village green, East Linton, 1956; Gifford, 1958; grassy banks, Biel Estate, *Miss E. P. Beattie.* Disused railway line, Saltown, 1962, *Miss M. Mc. Webster* (BM).

83. EDINBURGH: near Temple, grassy bank near houses; near Gorebridge, grassy bank near houses; Juniper Green station, grassy bank, 1955; Lasswade, waste ground; roadside bank, Heriot, *Miss E. P. Beattie.*

84. LINLITHGOW: roadside bank, Abercorn, 1957, *Miss E. P. Beattie.*

*85. FIFE: University of St. Andrews, pest of lawns since c. 1935, *J. Burnett.* All along the Lade Braes, St. Andrews, *Mrs. M. H. E. Cunninghame,* comm. *Miss E. P. Beattie.* Kemback area, ex *B.S.B.I. Maps Scheme.*

*86. STIRLING: north bank of the Endick Water, by main road south of Drymen, 1960, *A. C. Crundwell* (GL). Stirling Castle and environs, ex *B.S.B.I. Maps Scheme.*

*87. W. PERTH: roadside verge near houses, Dunblane, *Miss E. P. Beattie.* Callander, *D. Henderson & B. L. Burtt.*

88. MID PERTH: Dunning, *A. W. Robson.* Near Bridge of Earn, Ardtalnaig; Stanley, ex *B.S.B.I. Maps Scheme.* Lawn at Lawers Manse, 1960, *Miss E. P. Beattie.*

89. E. PERTH: Balgersho, plentifully by sides of roadside ditch, 1932, *W. B. Ogilvie.* Railway embankments and river shingle, Blair Atholl, *Miss M. McCallum Webster.*

90. FORFAR: pest of lawns and shrubberies, Parkhill, 1954→; plentiful in shrubberies, and by a stream in grounds of Finavon Castle, near Forfar, 1954; field below Hare Craigs, Broughty Ferry, 1960, *Miss U. K. Duncan.*

91. KINCARDINE: Auchinblae, garden weed, ex *B.S.B.I. Maps Scheme.*

93. N. ABERDEEN: Rosehearty, Aberdeen; policies of Craigston Castle; near Huntly; Auchindachy, *Miss M. McCallum Webster.*

94. BANFF: Dufftown, *Miss M. McCallum Webster.*

96. EASTERNESS: Kingussie; Redcastle, ex *B.S.B.I. Maps Scheme.*

98. ARGYLL: near a garden on the outskirts of Salen, Loch Sunart, 1957, *Miss U. K. Duncan & Miss E. P. Beattie.* Side of ditch, hotel grounds, Ardbrecknish, 1960, *A. C. Crundwell* (GL). Roadside ditch, near Inshaig Hotel, Isle of Seil, *Miss C. W. Muirhead.* Glenure, ex *B.S.B.I. Maps Scheme.*

99. DUNBARTON: field on south side of Endrick Water, by main road south of Drymen, 1960, *A. C. Crundwell* (GL).

100. CLYDE ISLES: edge of marsh, Keppel Pier, Isle of Great Cumbrae, 1958, *B. W. Ribbons.* Waste ground near the Post Office, Brodick, Arran, 1961; grassy ground near Coast-guard station, Kildonan, Arran, 1961, *B.S.B.I. Field Meeting,* comm. *Miss U. K. Duncan.*

101. KINTYRE: Tayvallich, ex *B.S.B.I. Maps Scheme.*

*103. MID EBUDES: grassy bank within the policies of Castle Buie, Lochbuies, Mull, 1958, *Miss U. K. Duncan.* Iona, *R. E. C. Ferreira.*

104. N. EBUDES: banks of Abhain Choisleader, Edinbain, Skye, 1958, *B.S.B.I. Field Meeting.*

*105. W. ROSS: Letterfearn; Strome Ferry, *Miss M. McCallum Webster.*

106. E. ROSS: Fortrose, Black Isle, pest of lawns and shrubberies, 1956, *U. K. Duncan.*

*108. W. SUTHERLAND: grassy roadside, Lochinver, 1957, *R. A. Graham & R. M. Harley.*

110. OUTER HEBRIDES: edge of path in shrubbery, grounds of Lewis Castle, Stornoway, 1959, *Miss U. K. Duncan.*

*111. ORKNEY: road verge, Sandwick, 1960, *Miss E. R. Bullard* (BM). Spreading over gardens and roadsides in most of Orkney, and has been reported from North Ronaldsay, the most northern isle (Bullard, 1960).

*H.1. S. KERRY: roadside bank, Fybagh, between Castlemaine and Inch, 1952; lane at Kilcummin, near Stradbally, 1957, *F. W. Simpson.* East part of Valencia Island, 1960, *D. McClintock.*

*H.2. N. KERRY: Killarney, ex *B.S.B.I. Maps Scheme.*

*H.3. W. CORK: rubbish-tip on sea-wall, half-a-mile south-east of Clonahilty, 1957, *D. P. Young.*

*H.4. MID CORK: acid grassland, Castletown, Berehaven, 1959, *P. J. Tyrer.*

H.9. CLARE: occurs as a garden weed, ex *B.S.B.I. Maps Scheme.*

H.10. NORTH TIPPERARY: occurs as a garden weed, ex *B.S.B.I. Maps Scheme.*

H.11. KILKENNY: occurs as a garden weed, ex *B.S.B.I. Maps Scheme.*

H.12. WEXFORD: lawn near a house at Fearns (Harrison, 1958).

H.13. CARLOW: occurs as a garden weed, ex *B.S.B.I. Maps Scheme.*

H.15. S.-E. GALWAY: occurs as a garden weed, ex *B.S.B.I. Maps Scheme.*

H.19. KILDARE: occurs as a garden weed, ex *B.S.B.I. Maps Scheme.*

H.20. WICKLOW: weed in Mount Usher gardens, 1961, *R. S. R. Fitter.*

H.21. DUBLIN: an abundant pest of many Dublin lawns, *Irish Times*, 5th May 1952. Roadside bank, Stepaside; lawn weed, Booterstown, 1961, *R. S. R. Fitter.*

*H.26. E. MAYO: roadside bank, Ballina, 1933, *C. Pearson* (TCD)—not H.27, W. Mayo as cited by Bangerter & Kent (1957). Portree House, Lough Carra; Ballinock Churchyard, 1957, *D. McClintock.*

H.27. W. MAYO: roadsides and streamsides, Bangor, 1957, *D. McClintock.*

H.28. SLIGO: around Downhill House; Owenmore-Bursa tributaries east of Moy river, Ballina, 1957, *D. McClintock.*

H.38. DOWN: roadside not far from Donaghadee (Harrison, 1958). Garden weed, Mahee Island, Strangford Lough, 1960, *R. S. R. Fitter.*

H.39. ANTRIM: by river at Armoy; Shane's Castle, 1958, *J. McK. Moon* (Carrothers & Moon, 1960). Greenslaw, in two places, 1960. *D. McClintock.*

H.40. LONDONDERRY: roadside, Church Island, 1958, *J. McK. Moon* (Carrothers & Moon, 1960). Garden pest, Whitepark Bay, 1960, *R. S. R. Fitter.*

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NOTES ON BRITISH CREPIS

By J. B. Marshall

1. Introduction and Key

The genera of *Compositae* included within the tribe *Cichorieae* (subfamily *Liguliflorae* of some classifications) are often very much confused and misidentified. Confusion of these yellow-flowered *Compositae* is perhaps aggravated by somewhat similar and quite meaningless vernacular names. Superficial resemblances perhaps account for the confusion of the genus *Crepis* with other genera and the species one with another. It is hoped by the author that this confusion within the genus will be lessened by this introduction and key, and by subsequent notes. The proposed notes will give selections of authenticated records, vice-county distribution, etc., of those species which have been enumerated in the various British lists. (See Tables 1 and 2.)

Gilmour and Walters (1954) produced a very helpful key that separates most of the genera and the more common species of yellow-flowered *Compositae* including *Crepis*. Drabble (1933) produced a key and gave a short account of fourteen species of British *Crepis*. This key included most of the species that had at that time been published in British lists (see Tables 1 and 2) and included *Crepis oporinoides* Boiss., an endemic of southern Spain which at the time of writing he believed had been found in this country. The nomenclature used in the present notes follows that of Dandy (1958) who enumerated eight species indicating three of them as believed introductions.

The two keys mentioned above and descriptions in some Floras give importance to beaked "achenes" (cypselae) as a means of separating *C. foetida, C. setosa* and *C. vesicaria* subsp. *taraxacifolia*. These species are included in the section *Barkhausia* (Moench) Gaudin, other species by way of contrast being separable by having achenes 'not beaked'. It may perhaps be thought that in dealing with the British species it would be quite satisfactory and convenient to divide them into two such easily recognisable sections. *Barkhausia* has however not been treated as a section by Babcock (1947), who in his great work on the whole genus divided it into twenty-seven sections, the three species mentioned above being placed in different sections. In the case of *C. vesicaria* subsp. *taraxacifolia* the achene character is ideal if fully mature heads are present on the material being examined, but otherwise it can be very misleading. The slender beaks to the achenes only reach their full length towards the latter part of maturity. In the juvenile stage before much development has taken place the achenes of *C. vesicaria* appear very similar to those

TABLE 1. NATIVE AND NATURALISED SPECIES ENUMERATED IN BRITISH LISTS.

				Editions of "London Catalogue of British Plants"									
	Dandy 1958	Druce 1928	Druce 1908	XI 1925	X 1908	IX 1895	VIII 1883	VII 1874	VI 1867	V 1857	IV 1853	III 1850	II 1848	I 1844
**Crepis foetida L.	559/1	416/9	1500	1012	924	884	828	767						
(*Barkhausia foetida* (L.) Schmidt)									585	585	585	585	585	585
*Crepis vesicaria														
subsp. taraxacifolia (Thuill.) Thell.	559/2													
(*Crepis taraxacifolia* Thuill.)		416/10	1502	1013	924	885	829							
(*Barkhausia taraxacifolia* (Thuill.) DC.)									586	586	586	586	586	586
Crepis setosa Haller f.	559/3	416/11	1503	1014	926	886	830	769						
(*Barkhausia setosa* (Haller f.) DC.)									587	587	587	587	587	587
Crepis mollis (Jacq.) Aschers.	559/4	416/1	1492	1018	930									
(*Crepis hieracioides* Waldst. & Kit., non Lam.)							834							
(*Crepis succisaefolia* (All.) Tausch)						890		772	566	566	566	566	566	566
Crepis biennis L.	559/5	416/3	1494	1017	929	889	833	771	564	564	564	564	564	564
Crepis capillaris (L.) Wallr.	559/6	416/5	1497	1015	927									
(*Crepis virens* L.)						887	831	770	563	563	563	563	563	563
*Crepis nicaeensis Balb.	559/7	416/4	1495	1016	928	888	832							
Crepis paludosa (L.) Moench	559/8	416/2	1493	1019	931	891	835	773	567	567	567	567	567	567

Crepis druceana Murr. ex Druce. This name was published in 1926 (*Rep. Bot. Soc. & E.C.*, **7**, 774). It was not included as a numbered species by Druce in *British Plant List*, edition 2 (1928), but was given as a synonym of *C. capillaris*.

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*Introduced.

**Probably introduced.

TABLE 2. DOUBTFUL AND CASUAL SPECIES ENUMERATED IN BRITISH LISTS.

	Warburg	Pearsall	Pearsall	Pearsall	Druce	Druce	Druce	Druce	Lond. Cat. Brit. Pl. I	Lond. Cat. Brit. Pl. II
	1950	1934	1933b	1933a	1929	1928	1921	1908	1844	1848
Crepis foetida										
subsp. commutata (Spreng.) Babc.	416/9c									
(*Rodigia commutata* Spreng.)										
Crepis tectorum L.						414/1		1487		
Crepis pulchra L.						416/6		1496		
Crepis rubra L.						416/7		1498	565	565
Crepis alpina L.						416/8		1499		
Crepis sancta (L.) Babc.	416/13					416/12		1501		
(*Lagoseris nemausensis* Bieb.)										
Aetheorhiza bulbosa (L.) Cass.	416/(2)1					418/1	1504(10)			
(*Crepis bulbosa* (L.) Tausch)										
*Crepis foetida					416/6(2)					
subsp. rhoeadifolia (Bieb.) Schinz & Thell.	416/9B									
(*Crepis foetida* var. *hispida* Bisch.)		416/9b								
Crepis zacintha (L.) Babc.	416/14									
(*Zacyntha verrucosa* Gaertn.)				430/(2)1						
†Crepis oporinoides Boiss.			416/3(2)							

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*Drabble (1933) stated there were examples of this subspecies in his own herbarium. After his death his herbarium was presented to the British Museum (Nat. Hist.) by Mrs. H. Drabble. When this was examined later no material named as such was found.

†A misidentification of *C. biennis* L. *C. oporinoides* is endemic to southern Spain. Much controversy followed the report of its alleged occurrence in Britain.

of *C. biennis.* In the latter species they are very markedly tapered at the top before swelling is very advanced, and those that are abortive sometimes elongate without swelling and give the false impression of a beak. The difference in the number of ribs on the achenes is often given in some Floras as an additional means of separating these two as well as other species. This character is likewise of no use if mature heads are not present.

The two species mentioned above are notoriously polymorphic. The very widespread *C. capillaris* is even more so. These three species have often been much confused one with another and still are. From about 1875 and during the first half of the present century additional confusion with *C. capillaris* and *C. biennis* was caused by the introduction of the alien *C. nicaeensis* which became well established usually in newly sown grassland and in leys of clover, lucerne and sainfoin. It is now considered extinct in this country. *C. vesicaria* subsp. *taraxacifolia* during the present century has increased at a prodigious rate and is now very abundant and widely distributed over the southern and some midland counties. When this plant was less frequent and not well known, specimens of it were sometimes wrongly named *C. foetida,* and *vice versa. C. foetida,* however, has decreased and now has a very limited distribution.

The remaining three of the eight species mentioned in Dandy (1958) (see Table 1) appear to be far less misidentified in the herbaria so far examined by the author. The alien *C. setosa* seems to be nearly always true to its specific name which so very aptly characterises the plant by its most noticeable feature. This aptness has perhaps contributed a lot to correct identification. *C. mollis* and *C. paludosa* have not often been confused with other species of *Crepis* but often, quite understandably, with the genus *Hieracium* and less frequently with each other. A synonym of *C. mollis* in general use over a period of years was *C. hieracioides* Waldst. & Kit. (non Lam.) a very appropriate but illegitimate name. Another suitable name for it now relegated to synonymy is *C. succisaefolia* (All.) Tausch, the leaves being remarkably like those of *Succisa pratensis.*

The naming of *Crepis* from keys and descriptions in Floras is not easy. Leaf shape, stature of plant, degree of pubescence and glandulosity vary very considerably. Varietal names have been published for some of these variations. Babcock (1947) mentions only some of them and merely numbers the "minor variants" of species and subspecies. The polymorphism of the more common species makes the naming of juvenile and particularly sterile material very difficult. With only a limited selection of more or less constant characters the following key has been produced to help in the naming of material in a flowering state.

KEY TO THE BRITISH SPECIES OF CREPIS

1. Involucral bracts remaining expanded after flowering; plants perennial with fibrous-rooted rootstock 2

Involucral bracts folding inwards for a period after flowering, the tips tightening around pappus and developing achenes, relaxing, spreading and reflexing with maturity; plants annual, biennial, or rarely short-lived perennials with short tap-roots 3

2. Stem leaves oblong-spathulate, sessile, semi-amplexicaul; leaf margins entire or sometimes very slightly repand with a few minute barely perceptible teeth; involucral bracts with slight scattered pubescence and gland-tipped hairs; pappus soft, white; achenes reddish-brown .... *C. mollis*

Stem leaves ovate or lanceolate, amplexicaul, cordate-auriculate; leaf margins with usually well-developed runcinate teeth; involucral bracts sparsely or thickly beset with long black setae and short gland-tipped hairs; pappus light brown, brittle; achenes straw-coloured, columnar, truncate .... *C. paludosa*

3. Involucre and branches of inflorescence sparsely or thickly beset with stiff yellow bristles .... *C. setosa*

Involucre not covered with stiff yellow bristles 4

4. Involucral bracts with short silky pubescence on inner surfaces, dark greenish-black with conspicuously light-coloured scarious margins, canescent or floccose, less frequently almost glabrous with black glandular and eglandular hairs; lowermost bracts lanceolate to narrowly ovate, horizontally patent 5

Involucral bracts glabrous or microscopically pubescent on inner surfaces, not conspicuously two-coloured and scarious-margined; lowermost bracts linear, appressed or slightly spreading 6

5. Style arms greenish-brown; involucre cylindric to narrowly campanulate; heads medium-sized, 1·5-2·5 cm.; florets sometimes with streaks of reddish-purple beneath, sometimes without; mature achenes light brown, 3·5 mm., gradually attenuated into a slender beak of equal length .... *C. vesicaria* subsp. *taraxacifolia*

Style arms yellow; involucre narrowly campanulate; heads large, 2·5-3·5 cm.; florets not streaked with reddish-purple beneath, a laxness in posture giving the 'flowers' a very slight shaggy appearance; mature achenes orange-brown, 4-8 mm., tapered but not beaked .... *C. biennis*

6. Heads drooping in bud (? sometimes erect); involucre clothed with short light greenish-brown pubescence and occasional longer pilose hairs, sometimes also with very short gland-tipped hairs; inner involucral bracts tightly embracing marginal achenes; central achenes long-beaked; pappus copious, persistent .... *C. foetida*

Heads erect in bud; involucre not pubescent, sometimes with black or greenish-black glandular hairs or bristles; achenes not beaked, not embraced by involucral bracts; pappus caducous 7

7. Stem closely hispidulous below; leaves slightly scabrous, sparsely or densely hispid; lower involucral bracts relaxing and slightly spreading at maturity; receptacle foveate, favose, alveoli fimbrillate (erect membranous fringes to pits, giving a honey-comb appearance beset with stiffly erect cilia); achenes orange-brown, 2·5-3·5 mm. .... *C. nicaeensis*

Stem glabrous below, sometimes with a few scattered hairs; leaves smooth, glabrous or sometimes with scattered hairs on midrib and on one or both surfaces; lower involucral bracts remaining appressed (a few sometimes wither and twist a little at maturity); receptacle usually* with only a few short cilia, becoming mammose; achenes light fuscous-brown, 1·5-2·5 mm. .... *C. capillaris*

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*I have recently examined a form of *C. capillaris* with favose receptacles and well developed non-ciliate fimbrillae. There are several examples of this form from the Orkney and Hebridean Islands in the herbarium of the British Museum.

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ESPARTO GRASS ALIENS IN FIFE (v.c. 85)

By E. P. Beattie

Most of our paper is made from wood pulp, a mere 10% or so being made from esparto grass. The best esparto comes from Spain; the second best from North Africa. Most of our supplies come from North Africa. The grass is never cut: it is pulled. It looks like hay, but it is much tougher and much more wiry, so much so in fact that it is said to make good pipe cleaners. If a strand of esparto is dampened and looked at through a microscope, it will be seen that it is really a leaf, tightly rolled in order to conserve moisture. The plant is also covered by a coating of wax—a further precaution against excessive loss of moisture. The papermaker extracts the wax and sells it to manufacturers of shoe-polish and linoleum.

The first thing the papermaker has to do is to get rid of any African soil which may still be adhering to the plants. To do this the esparto is put through a machine called a duster. This is when the alien beetles, various other insects and sometimes even a snake come to light. The grass is then boiled in caustic soda for a period under pressure until it becomes a yellowish pulp. Then the caustic soda must be removed or the paper would have a very short life. In all, there are five processes. Esparto grass is economical to use because it is possible to recover the chemicals and use them again and again. Finally, there remains the dry, fragmentary, hay-like wisps which have to be disposed of. Some paper mills have a liquid sewage system which takes care of the waste. A few, however, are surrounded by a large area of waste ground on which the short hay-like wisps can be stacked and burnt. The waste is very soft and was used by local farmers as bedding for their cattle until disease broke out amongst the beasts and, as the disease was confined to those farms which used the waste for bedding, the mill owners were forbidden by law to sell it for such purposes and, in order to prevent it being blown hither and thither by the wind, those papermakers who had no sewage system, were compelled to burn it. In Fife, this is done on Saturdays. The resultant ash is tan-coloured. Very often, however, in a wet summer, which is not unusual in Scotland, rain puts out the flames before the entire stack is burnt. It is, therefore, on the lower slopes or fringes that those seeds which have managed to survive the long immersion in various chemicals, germinate and flower.

It is possible that a few species accidentally introduced with esparto grass as seeds might even become established, e.g. *Eruca sativa* Mill., *Vella annua* L., *Matthiola tristis* (L.) R.

Br. and *Moricandia arvensis* (L.) DC., but this is very difficult to ascertain as the waste is not always dumped exactly in the same spot, with the result that a thriving alien colony a few yards to the right or left may be obliterated. Although a number of the species set seed, the alien plants are confined to the small area, or areas, on which the waste is dumped. This may be because the young seedlings are crowded out by our native species. If dumping of the waste ceases at a particular spot for a year or two, then it is recolonised by *Senecio vulgaris* and later by *Tripleurospermum maritimum.* I am sure that in 1958 the alien flora would have been very much greater had the waste not unfortunately been dumped on top of thriving colonies of *Chenopodium rubrum* and *Atriplex littoralis,* thus severely limiting the 'fringe' area between the totally burnt part and the surrounding dense *Chenopodium/Atriplex* jungle.

The following list shows the species which have occurred from September 1955 to November 1960. I discovered this area by chance in September 1955. As, however, there was so little to be seen when I revisited it in September 1956, I thought that it was "finished", and did not return to the spot until September 1958, when I found alien plants in bloom again. 1959 produced very little, due, I think, to the exceptionally dry summer which would prohibit germination and also because, in the absence of rain, the waste would be almost wholly burnt.

GLAUCIUM CORNICULATUM (L.) Rudolph	1959	1 plant
BRASSICA TOURNEFORTII Gouan	1960	2 plants
ERUCA SATIVA Mill.	Present on all visits	Many plants
VELLA ANNUA L.	Present on all visits	Many plants
MORICANDIA ARVENSIS (L.) DC.	1955: 1956: 1960	3 plants
ISATIS TINCTORIA L.	1958	1 plant
BISCUTELLA LAEVIGATA L.	1958	1 plant
MATTHIOLA TRISTIS (L.) R. Br.	Present on all visits	Many plants
MALCOLMIA MARITIMA (L.) R. Br.	1960	A few plants
SISYMBRIUM IRIO L.	1959: 1960	Many plants
SILENE GALLICA L.	1948: 1960	Several plants
S. PORTENSIS L.	1958	1 plant
VACCARIA PYRAMIDATA Medic	1960	1 plant
PARONYCHIA ARGENTEA Lam.	1958	1 plant
HERNIARIA GLABRA L.	1960	A few plants
H. HIRSUTA L.	1960	A few plants
H. CINEREA DC.	1958	2 plants
LOEFLINGIA HISPANICA L.	1958	1 plant
MESEMBRYANTHEMUM CRYSTALLINUM L.	1960	1 plant
AMARANTHUS HYBRIDUS L.	Present on all visits	A few plants
A. ALBUS L.	Present on all visits	A few plants
A. THUNBERGII Moq.	1955	A few plants
CHENOPODIUM VULVARIA L.	1958	2 plants
C. MURALE L.	1958: 1959: 1960	Several plants
C. FOLIOSUM Aschers.	1960	1 plant

C. capitatum (L.) Aschers.	1955	1 plant
Bassia sp.	1958: 1960	3 plants
Malva parviflora L.	Present on all visits	Large patch
Erodium cicutarium (L.) L'Hérit.	Present on all visits	Many plants
E. triangulare (Forsk.) Muschl.	Present on all visits	Many plants
Astragalus cruciatus Link?	1960	1 plant
Anagallis arvensis L. (blue variant)	1960	1 plant
Plantago lagopus L.	1958	3 plants
P. loeflingii L.	1960	Several plants
Scabiosa atropurpurea L.	1958	Several plants
Calendula arvensis L.	1958	Several plants
Filago minima (Sm.) Pers.	1958	2 plants
F. spathulata C. Presl	1958: 1960	Many plants
Astericus aquaticus (L.) Less.	1959	1 plant
Anacyclus valentinus L.	1955: 1958: 1960	Several plants
Artemisia campestris L.	1960	Several plants
Amberboa muricata (L.) DC.	1958	Many plants
Centaurea melitensis L.	1958	Many plants
Hedypnois cretica (L.) Willd.	1958	A few plants
Urospermum picroides (L.) Schmidt.	1960	A few plants
Leontodon salzmannii (Sch. Bip.) Ball	1958	2 plants
Picris sprengeriana (L.) Poir.	1958	A few plants
Reichardia tingitana (L.) Roth	1958	A few plants
Sonchus tenerrimus L.	1958	A few plants
Lolium rigidum Gaudin	1958	2 plants
Briza maxima L.	1958	1 plant
Bromus rubens L.	Present on all visits	Several plants
Brachypodium distachyon (L.) Beauv.	1960	3 plants
Phalaris minor Retz.	1960	A few plants
P. tuberosa L.	1960	A few plants
P. paradoxa L.	1960	A few plants
Setaria viridis (L.) Beauv.	1960	1 plant
S. verticillata (L.) Beauv.	1960	1 plant
Schismus barbatus (L.) Thell.	1960	3 plants
Cutandia divaricata (Desf.) K. Richt.	1958: 1960	A few plants
C. memphitica (Spreng.) Dur. & Schinz	1960	A few plants
C. philistaea (Boiss.) B. D. Jackson	1958: 1960	A few plants
Vulpiella stipoides (L.) Maire	1960	1 plant
V. incrassata (Lam.) Andreánszky	1958: 1960	A few plants

I am indebted to the staff of the Royal Botanic Garden, Edinburgh, for determination of the above species.

LELAND'S 'FIRRES'

By W. B. Yapp
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The older floras, such as Syme (1868) and Bentham and Hooker (1924), all say firmly that the tree which they call the Scotch Fir, *Pinus sylvestris,* is not native south of the border, though its remains are often found in the peat, and as recently as 1936 Carter wrote: "Scotch Fir . . . Now absent as a native from north-western France, Belgium, Holland, Denmark, and lower Rhineland, and probably from England and Ireland". In the last quarter of a century views (as well as the vernacular name of the tree) have changed, and Warburg (1952) writes: "Scots Pine . . . usually supposed to be introduced in England, but possibly persisting in small quantity since the Boreal period". Godwin (1956), is more emphatic, and says: "there is no reason against the view that some indigenous *P. sylvestris* has persisted upon the surface of our raised bogs from the earliest stages of their formation".

He does not, however, give any reasons for this view, and in fact there is to be put against it the very strong argument that if such trees had survived they would certainly have been recorded by the early naturalists.

Pennant (1771 and 1774-76) in the eighteenth century carefully sought out all the existing examples of the tree that he could find or hear of in Scotland, and natural-looking firs still exist in most of his stations, but he knew nothing, so far as my reading goes, of the natural occurrence of the tree in England or Wales. His journeys covered most of these two countries and he would surely have mentioned examples had he known of any. Indeed he says that Evelyn was the first to cultivate pines in England.

The only author whom I have found to give evidence for his belief that the Scotch fir persisted in England through historical times is Tansley (1939), who says that John Leland (1506?-1552), a London Antiquary, who travelled widely in Britain, saw 'Firres' or 'Fyrres' in Co. Durham in 1540, and comments: "These may have been the last remains of the native Scots pines in the north of England", and "It is probable that this refers to pine". This seems conclusive evidence, so far as it goes, for the presence of the tree in Durham in the sixteenth century, but deserves further examination.

There is no evidence that Tansley had read Leland, and his quotations are in fact taken from Taylor (1936), who uses them herself for quite different purposes, and makes no special reference to the vegetation. A reading of Leland shows that he mentions 'firres', in various spellings, several other times. His papers were not published in his life-time, and the following quotations are all taken from the 3rd edition of the transcription published by Thomas Hearne in the eighteenth century.

Vol. 1, p. 71: 'bytwixt *Northalverton* and *Smithon* Bridge is low Pasture and Mores, whereof Part beere sum fyrres'.

1, 77: 'From *Duresme* over *Framagate* Bridge to *Chester in the Streate*, partely by a litle Corne Ground, but most by Montainiouse Pasture and sum Mores and Firres'.

1, 77-78: 'Thens to *Geteshed* vij. Miles by Montaniouse Ground with Pasture, Heth, More, and Fyrres'.

[These two are Tansley's quotations.]

2, 110: [Launceston] 'Thens an 8. Miles by Morisch and Hilly Ground and great scarsite of Wod, insomuch that al the Countery therabout brennith Firres and Hethe'.

3, 133: [Launceston] 'The people ther brenne for the most part Firres and Ling'.

5, 79: 'But the Ground in divers Partes of *Penbrokeshire* berith Se Coles, wherwith communely the People make Fier and with Firres, as thei do also about *Cairmardine*, though ther be better Plenti of Wood'.

5, 80: [Near Tenby] 'In the Parke is veri litle or no hye Woode, but Shrubbis and Fyrris, like as in the ii. Parkes about *Carew* waullid with Stones'.

The first point to note is that, like most Elizabethans, Leland spelt inconsistently and largely phonetically, the second that it seems odd that he should speak of the burning of 'firres', coupling it with the use of heath and ling, when he does not mention the burning of oaks or elms, though he mentions these trees in other connections. Thirdly, the places where 'firres' occur are not, on the whole, those where, with the Scottish relics well known to us, we should expect *Pinus sylvestris* to survive. Framwellgate Moor, just north of the city of Durham on the Great North Road (A1) has a thick exposure of sand and is a possibility, but Smeaton is all enclosed farmland, some under the plough and apparently loam, while Cornwall and West Wales must surely have too Atlantic a climate. Lastly, it is to be noted that where he is clearly referring to *Pinus sylvestris* in the peat, he uses the phrase 'Fyrre trees' or 'Fyrre Woodde', as in the following.

5, 90-91: [Near Cholmondeley, Cheshire] 'I saw the great numbre of Firre Trees, [the wiche the Inhabitantes therby communely digge up for Fier Wood, but ther did I se no Fyrre Trees grouing]. Oftentimes in diggin in this Mosse or More for Petes or Turves they finde the hole Trees of the first, sum short and sum veri long, without Twike or Bow, lying sumtime not a Foote, sumtime iii. or iiii. Foote depe in the Ground, but how or when thes Trees cam doune other be Cutting or Wind Faulle no Manne ther can telle. The Wood of them in Burning savorith of Resine'.

5, 93: [Between Northwich and Manchester] 'Here about in a Mosse is Fyrre Woodde'.

5, 95: [Lidiate Moss near Leigh, Lancs.] 'in the right side wherof my Gide said that ther were Rootes of Fyrre Wood'.

5, 98: [Near Garstang] 'Al *Aundernesse* for the most parte in time past hath beene ful of Wood, and many of the Moores replenishid with hy Fyrre Trees.

But now such Part of Aundernesse as is toward the Se is sore destitute of Woodde'.

7, 11: 'Suche Firre Trees overthrowne and coverid with Bogge and Merche as be in *Chestershire*, *Lancastershire* and *Shrobbeshire* be found in some Places of the Isle of *Oxolme*'.

7, 23: 'Ther be founde in Morisch and Mossy Ground a vii. Miles from *Shrobbesbyri*, and yn other Places of the Shire, Fyrwoodde Rootes, and also the hole Trees hewen downe in olde time; but of whom, or for what cause, no Man there can telle. They finde them lying yn the Grounde, sumtime a Foote or ii. depe, sumtime a v. or vi. Foote depe. Many of them be of a greate Lengthe, and without Twysxe. Yn brenning they smel welle'.

7, 35: '*Cholmeley* Haul, a fair Howse, having a litle Mere by hit, a fair Woode, and a Mosse of Fyrwod'.

7, 48: 'Lancashire Firre Woode in Chately Mosse'.

All this suggests that 'firres' was simply Leland's way of spelling 'furze' and that the stuff that country folk burnt when they had no wood was *Ulex europaeus,* which still grows on Framwellgate Moor, on the Cornish heaths and in many other places near where he found it. Murray (1901), gives the spelling 'firres' as a sixteenth century variant of 'furze' but not 'fyrres' or 'fyrris'.

Proof comes from the following passage.

5, 51: [Near Aberdaron, Carnarvonshire] 'They burn Turffes, Ferne, and Gorses, otherwise caullid Fyrres'.

5, 58: [Denbigh—a marginal note] 'This litle Parke is caullid in
firres
Walsh Gorsenodiog'.

Leland's firres, which have led Tansley, and through him many others (including myself) to teach that *Pinus sylvestris* survived in England into historic times, are then not firs but furze. Always verify your references.

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SOME NEW FACTS ABOUT THE EARLY HISTORY OF THE SOCIETY

By J. E. Lousley

A letter from Hewett C. Watson to J. G. Baker which I found recently between the pages of a book in my library provides important information about two critical periods in the early history of our Society. The purpose of this note is to place the contents of this letter on permanent record with a short explanation of its significance.

The Botanical Society of the British Isles is descended from the Botanical Society of London founded in 1836. For nearly twenty years this Society was extremely active with regular meetings in its rooms in London, where a valuable herbarium and library were maintained. Quite suddenly there was a decline in activity, the exchange of specimens was discontinued and financial difficulties led to a sale of the assets. Whereas the period of prosperity was adequately recorded, very little information is available about the crisis. The letter printed below states that the surplus from the liquidation amounted to only about £30, and that this was given to George Dennes, the Secretary, who was in a starving condition. In his earlier days as Honorary Secretary, G. E. Dennes had rendered excellent service, and in 1847 his portrait in oils was presented to him as a testimonial by the members (*Phyt.,* **2**, 815, 1847). Later references to his work are less complimentary and it seems likely that the Society's difficulties were in some way connected with Dennes' affairs as a solicitor. In 1856 he disappeared, and is believed to have emigrated to Australia.

When the organisation in London was broken up, some of the more enthusiastic members made arrangements for part of the work to be carried on elsewhere. On 2nd November, 1857, appropriate resolutions were adopted at the 5th Annual Meeting of the Thirsk Natural History Society with a view to carrying on the exchange activities of the Botanical Society of London which was described as being "in abeyance" (*Phyt.* (N.S.), **2**, 294-296, 1857). By introducing a new class of Corresponding Member the Thirsk organisation, under the Presidency of J. G. Baker, was able to include in its membership leading supporters of the London society, and although its main object was to continue the exchange of specimens, its influence on British botany extended over a wider field.

On 9th May, 1864, J. G. Baker lost his home and nearly all his possessions in the famous fire at Thirsk. The family business over which he lived was also destroyed, and although the premises were soon rebuilt his interest was in botany rather than commerce.

Gilbert Baker needed little encouragement to accept an appointment on the staff of the Royal Botanic Gardens, Kew, and the letter printed here was written after the decision had been made, but before the date for commencing his new duties had been fixed.

Thus the future of the exchange club activities presented a most difficult problem. Gilbert Baker was joint curator with William Foggitt. The latter was not in a position to carry them on alone at Thirsk, while Baker was taking up duties at Kew which would require the whole of his energy and the burden of the exchange work would be all the heavier without an experienced collaborator. Watson's letter sets out the difficulties of time and money very fairly, and gives sound advice. In the event, Baker decided to continue the work, and in the *Report of the Thirsk Natural History Society* for 1865, published in 1866, there is a "Notice to Members" which reads:—"Owing to the dissolution of the Thirsk Natural History Society, the Botanical Exchange Club will in future be conducted by Mr. J. G. Baker, whose present address is 25 Sydney Villas, Richmond, Surrey". In the following year, 1867, the London Botanical Exchange Club issued the "Report of the Curators for 1866 . . . " which includes the following:—"NOTICE.—The Thirsk Natural History Society having been dissolved, the Botanical Exchange Club formerly connected with it is removed to London, the present Curators being Mr. J. G. Baker and Dr. Henry Trimen".

The letter reads as follows:—

Thames Ditton. S.W.
Jany. 19, 1866.

My Dear Sir,

If I may use the freedom of advice, I would say, take your own convenience *when* you go to Kew, that is, suit the date to your own needs, not to his. Unless you begin by showing that there is another's ties to be considered, and not his own wishes solely, you may become a slave more than is fair or agreeable. You know whom I mean by the pronoun "his".

As to the Exchange Club, I really don't see how it can be kept up. With Eng. Bot. [*English Botany*, Ed. 3] on his hands Mr. Syme can spare no time to it, I fully believe. Before replying to your letter of 11th. I tried the chance of putting the query to Dr. Hooker, whether he could, & would if could, aid the botanists of England at all by letting Kew become the centre for distribution. His reply is not at all unfriendly, but still to the effect that not a minute of your (official) time could be spared for any such purpose, nor any accommodation be given. I scarcely ventured to hope for any more favourable response, because he holds British botany in a sort of contempt, & being very much occupied with his own papers & publications, he naturally wishes you & Mr. Oliver to take as much off his hands as possible, of the *Kew* duties.

Unfortunately, the surplus of about £30, in winding up the old B.S.L. [Botanical Society of London] was given to Dennes, with the consent of all the Resident Members who had attended the winding up meetings; so that there is nothing to re-start with. I can't say that I do now regret this disposal of the surplus, for he was really in a starving condition at the time. But it makes the unfortunate fact that there is no fund, out of which to pay for carriage & housing of duplicates, and other incidentals, even if skilled time were at command from volunteer distributors.

I saw Mr. Newbould on Wednesday. He would give some time to it. But he is a novice in such occupation, and would require to be put in the way, though by no means a manageable man for dealing with & directing. Still, he would mean well, & would be careful & useful.

I am myself getting past such work from age & other ties. You will have too little of spare time *for yourself,* to make it safe for you to get trammelled with the distributions, unless you can see a good certainty of effective aid to work under your guidance. I mean that it would not be prudent in you, to pledge yourself & your time to the performance of a troublesome task which might likely be found too onerous.

If a room must be hired in London, wherein to keep the specimens, & do the sorting & distributing, the annual subscription of 6/- will not suffice for the expences [*sic.*]. A room at or near Kew might be less rent, but that locality would likely soon leave *you* all the work to do yourself. London is a true centre, Kew is not so.

Yours very truly,
Hewett C. Watson.

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PLANT NOTES

25/1. Polypodium vulgare L. *sensu lato*. Recent work on the *Polypodium vulgare* complex has shown that this consists of three distinct cytotypes which have now been given species status (Shivas, 1961). Hybrid triploid, tetraploid and pentaploid plants are occasionally found. Shivas (1961) and Manton (1950) have described the various characters by which these can be separated.

A clone collected from a wall near Grasmere had a combination of characters which did not fit the descriptions of any of these species. Sixty-five counts of indurated cells in the sporangia yielded an average of 15.9 with a range of 11-22. This compares with an average of 11-13 for tetraploids and a highest count of 17 recorded by Shivas. In comparison with most tetraploids the individual indurated cells were small.

In common with *P. vulgare* L. *sens. strict.* these plants had circular sori, a narrow frond shape (Length/Width at mid-point ratio for 20 fronds = 2·82) and sent up new fronds in early summer. A few observations suggest that the size and shape of their stomata is consistent with the tetraploid. However, the spores, which germinate well on Knop's agar, had a mean length of 77·6 ± 1·97 μ, a hexaploid (*P. interjectum*) character (Shivas, 1961).

These plants were unlikely to be hybrids because sporulation was abundant, the spores were evenly shaped and showed almost 100% germination on agar. Moreover, approximate counts of chromosomes in root-tip mitoses came to 146, 133 and 141, indicating the tetraploid number of $2n = 148$.

It should be mentioned that these plants had a characteristic appearance. The coriaceous fronds often tapered evenly from the pair of pinnae second from the base, but they were most distinctive in that the pinnae were densely packed on the rachis and inserted at an angle, such that they appeared to be bent towards the frond apex.

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—G. F. Peterken.

168/R. Geranium retrorsum L'Hérit. In the summer of 1960 Lady Anne Brewis sent me for determination a scrap of a *Geranium* "from the far side of the main line" at Bordon Station, N. Hants., v.-c. 12, and pointed out that although it resembled both *G. dissectum* and *G. pusillum* it did not agree with the characters of either. In October, 1960, and on four occasions in 1961, I saw the plant growing at Bordon myself and it is evidently well established there. It is *G. retrorsum* L'Hérit. which is established in Alderney, and of which an account by D. H. Kent appeared in *Proc. B.S.B.I.* **3**, 284, 1959. L'Héritier in describing *G. retrorsum* (in DC., *Prodr.*, **1**, 644, 1824) cites "Banks (*v.s. cum semin. immat.*)", and the Bordon plant agrees well with the type in Herb. Mus. Brit.

A gathering of the Bordon plant by Miss M. McCallum Webster, on October 8, 1960, was determined by C. C. Townsend as *G. microphyllum* Hook. f. and was the subject of a paper in *Watsonia*, **5**, 43-44, 1961, but it is clear that it cannot be referred to this species. *G. microphyllum* as understood by New Zealand botanists is a slender, ± prostrate plant with leaves less than 25 mm. in diameter (Cheeseman, T.F., *Manual*, 533, 1925; Allan, H.H., *Flora*, 235, 1961), whereas the Bordon *Geranium* is 45 cm. or more tall, with leaves on the main stem 40 mm. across (not shown in all gatherings). That the modern interpretation is correct is confirmed by reference to J. D. Hooker's description and plate (*Fl. Antarc.*, **1**, 8, *t.* 5, 1844) and to the type from Lord Auckland's Island in Herb. Kew.

On all my visits to Bordon I have been surprised at the large number of carpels still attached to their beak after dehiscence, and thus remaining on the plant. This is also the case on the material collected by Miss M. McCallum Webster, and suggests that in this country, under the weather conditions of the last two seasons at least, the ejaculatory means of seed dispersal is likely to be much less efficient than is the case with allied native species. A seed which remains on the plant after the "catapult" has been operated will not get very far unless there is some further means of dispersal. In Alderney there is no evidence that the species has extended its range in 23 years. It was found by A. K. Jackson and H. K. Airy Shaw on June 18, 1938, at the railway crossing 100 yards west of Whitegates (Ref. 409 and 409 bis, Herb. Kew). The habitat now known is either the same, or very close, and, like Bordon, is by a railway track.—J. E. Lousley.

187/1×2. **Ulex europaeus × gallii.** 48, Merioneth; Arthog Bog, 1957; Dinas Oleu, Barmouth, 1960; Talybont Woods, and between Corsygedol and Llety Lloegr, 1961, P. M. Benoit.

This hybrid, which is not included in the *List of British Vascular Plants*, is probably frequent in the British Isles where *U. europaeus* and *U. gallii* grow together. The two species are completely interfertile, the pollen of their hybrids being as normal in appearance as their own, and they sometimes produce complex hybrid populations from which one can select continuous series of individuals linking the present species morphologically. It will be obvious from this that it is impossible to give a precise description of *U. europaeus* × *gallii* because of its variability; bushes of hybrid origin can, however, be recognised by at least some intermediacy in their characters, best seen in the ovule number, bracteole size, and flowering period (winter). The following provisional descriptions will indicate the ranges of variation within the parent species; it is hoped to publish a biometric study of the group later.

U. europaeus L. Larger bush, more bluish-green in colour. Primary spines strongly grooved, in summer usually hairy nearly to the tip.

Overall length of flower, 15-22 mm. Bracteoles 1.8-4.5 mm. Calyx soft with dense, somewhat spreading hairs. Petals lemon- to golden-yellow. Fruiting pedicels (fresh) 1.1-4 mm. thick. Pod (12-) 14-17 (-19) mm. Ovules (9-) 10-14 (-16). Flowering period September-May, maximum March-April.

U. gallii Planch. Smaller bush, more yellowish-green in colour. Primary spines weakly grooved, in summer usually hairy only near the base. Overall length of flower, 14-16 mm. Bracteoles 0·6-1·3 mm. Calyx with minute appressed hairs, appearing subglabrous to the naked eye. Petals golden-yellow. Fruiting pedicels (fresh) 0·7-0·9 mm. thick. Pod (8-) 9-13 (-14) mm. Ovules (3-) 4-6 (-7). Flowering period July-November, maximum August-September.

Living and dried material of the two species and the hybrid, from Arthog Bog, was shown at the Society's exhibition meeting of 25th November 1961.— P. M. Benoit.

224/0. **Acaena ovalifolia** Ruiz & Pav., 1798, *Fl. Peru*, **1**, 67, t. 103. V.c. 96, Easterness; well established for three-quarter mile on moorland roadside, Blackfold, near Inverness, Mrs. M. Cameron, det. C. C. Townsend, comm. M. McC. Webster (Hb. Mus. Brit., Hb. Kew, Hb. Webster).

A mat-forming perennial, very variable in size. Leaves rather thin, 3-10 cm. long, with 3-5 pairs of leaflets and a terminal one, the lowest pair rudimentary. Leaflets coarsely toothed, oblong, up to 15 mm. across, subglabrous above, ± densely hairy below. Terminal leaflet stalked. Flowering branches erect. Heads globose, up to 2·5 cm. in diameter, on hairy scapes 5-7 (12) cm. long. Fruiting calyx *usually with 2 spines*, rarely up to 14 mm. long, purplish. Sepals 4. Stamens 2. A native of S. America from Colombia to Tierra del Fuego and the Falkland Isles.—D. H. Kent.

325/11 × 17. **Rumex crispus** × **palustris** (**R.** × **areschougii** Beck. 1904). A hybrid with characters of both the putative parents and continuing to flower throughout the season. Radical leaves narrow lanceolate ± tapering to the base, margins undulate. Inflorescence much branched with ascending branches usually subtended by linear-lanceolate crisped leaves tapering to the base. Whorls distant below, crowded towards the end of the branches. Flowers mostly falling as the tepals enlarge. Fruiting perianths produced erratically, with segments triangular-ovate c. 4 mm. × 3·5 mm., truncate at the base, with several teeth 0·5-1 mm. or more long near the base on both sides, all with round or oblong tubercles which turn red at maturity.

The above description is from specimens from a single plant c. 75 cm. tall growing with *R. palustris* and near *R. crispus* at Eye Brook Reservoir, Rutland, v.-c. 55, 1961, J. R. Ironside Wood (*Hb. Lousley*). Foreign material, such as that collected by K. H. Rechinger in Burgenland, Austria, 1927 (*Hb. Lousley*) has fruiting perianths uniformly developed and with longer teeth. It has been recorded most frequently from Sweden (Murbeck, 1899) and Holland (Danser, 1923) and rarely from Austria and Germany (Rechinger, 1958) and France (Fournier, 1946).

Plants of this parentage as determined by Danser have been recorded from waste ground at Burton-on-Trent, Staffs.; Dundee, Angus; and Golspie, Sutherland (Druce, 1929). These all appear to have been errors.

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—J. E. Lousley.

491/H. **Lonicera henryi** Hemsley, *J. Linn. Soc.*, **23**, 363 (printed 359), 1888; *Bot. Mag. t.* 8375. 17, Surrey: thoroughly established in woodland near Fourwents Pond, Holmwood Common (Nat. Grid Ref. 51/183452), July 23, 1961, J. E. Lousley and B. M. C. Morgan (Hb. Lousley and Hb. Mus. Brit.).

An evergreen vigorous climber with very downy shoots. Leaves opposite, oblong-lanceolate to lanceolate, 5·5-13 cm. long, subacute to acuminate, subcordate or truncate at the base, margins ciliate, otherwise glabrous except for a few hairs on the midrib. Flowers 3-6, in terminal cluesters on hairy peduncles up to 1 cm. long; bracts subulate; calyx-teeth triagular-ovate, subglabrous; corolla 2-2·5 cm. long, yellow to purplish-red, 2-lipped, tube slightly ventricose, narrowed at the base, longer than the limb. Fruit ovoid, black. Native in the Hupeh, Szechuan and Yunnan provinces of China, and eastern Tibet. Introduced to cultivation by E. H. Wilson in 1908.

At Holmwood Common this plant occurs in abundance over an area of about 20 × 20 yards, mostly sprawling on the ground and over bushes and bracken. Flowers occur sparingly at least 10 feet from the ground on shoots twining up trees to the light, and fruit is produced in full exposure. *Lonicera henryi* has been known here to Miss Morgan for about 10 years, and, with *Spiraea menziesii* Hook. growing near, it probably originated from garden rubbish dumped on the Common. In any case it has grown for a lengthy period on commonland reverting to woodland under conditions of intense competition with native species. In spite of the quantity of the plant it is not easy to find, since it is difficult to penetrate the scrub, and it is most easily detected by observing the highest flowering shoots from the road. It flowers in June with a few late blooms in July and August.—J. E. Lousley.

375/1. Buddleja davidii Franch. On July 23, 1961, Miss B. M. C. Morgan took me to see a remarkable colony of *Buddleja* plants which she had found in a disused chalkpit (Nat. Grid Ref. 51/208517) on Betchworth Hills, above the Greystone Limeworks quarries, Betchworth, Surrey, v.-c. 17. Some hundreds of plants formed a dense mass on the sides of the pit, and exhibited a range of variation which was new to me.

Most of the plants were of forms differing little from those common in many places round London. A representative example (Ref. B) had rather broad leaves (c. 12 × 4 cm.) with finely serrated margins and dense unbranched panicles (c. 12 × 4 cm.) with richly coloured corollas. Those with the most purplish flowers were similar to improved hortal varieties.

With these grew a dozen or so later-flowering plants unlike any I had seen before (Ref. A). The branches were arching and drooping, terminating in large loose panicles (c. 40 × 35 cm.) with 30 or more branches which were sometimes compound. The corolla tubes were straight, hairy outside and pale mauve; the leaves narrow (c. 12 × 1·5 cm.) acuminate, with prominent white teeth, and very white beneath. There were also many intermediates with more sprawling habit than "B" and less branched panicles than "A". Material I collected from one of these bushes with mixed characters as Ref. C had a panicle with a fairly dense terminal spike with three lower branches, and leaves which on one stem varied in width from 0·8 cm. to 2 cm., and with less prominent teeth than "A". Consideration of the variation within this colony without reference elsewhere would have suggested the presence of two distinct species with hybrids.

Material of all three variants was sent to the Royal Botanic Garden, Edinburgh, and B. L. Burtt suggested that they are all *B. davidii* and pointed out that "Narrow-leaved forms with more open inflorescences are classified as *B. davidii* var. **nanhoensis** (Chitt.) Rehder. It is odd that your plants "A" seem abnormal in that the corollas are frequently deeply split". Further examination of ample material from China and from cultivated plants in the herbaria at the Natural History Museum and Kew confirms that my plants may all fall within the range of this variable species though I have failed to find any specimens as extreme as my reference "A".

The history of *B. davidii* var. *nanhoensis* seems to throw some light on the problem. It was first raised from seeds of plants found by Farrer growing in the river shingle of the Nan Hor, Kansu, China, and the collector's notes indicate that he had reason to expect it to be unstable. Material cultivated under this name is not uniform, though my intermediate material (Ref. "C") matches some cultivated material of the variety. My narrow-leaved plants agree better with the description in Rehder, *Man. Cult. Trees & Shrubs*, ed. 2, 796, 1947, than with the account in the *R.H.S. Dictionary of Gardening*, **1**, 326, 1951. The synonomy of *B. davidii* var. *nanhoensis* (Chitt.) Rehder is as follows:— *B. variabilis* . . . form, Farrer in *J. Roy. Hort. Soc.*, **42**, 64, 1916; Farrer in *On the Eaves of the World*, **2**, 52, 319, 1917; *B. variabilis* var. *nanhoensis* Chittenden in *J. Roy. Hort. Soc.*, **47**, 193, 1922; *B. davidii* var. *nanhoensis* Rehder in *J. Arnold Arb.*, **5**, 240, 1924.

It seems possible that the population in the chalk pit at Betchworth may have arisen from selfing of cultivated strains but this deserves further study. There are no gardens near, but since the seeds can be carried by the wind, and the pollen by lepidoptera, for long distances, the habitat provides only limited isolation. Specimens of "A", "B" and "C" are in Herb. Lousley, and of "A" and "C" in Herb. Mus. Brit.—J. E. Lousley.

643/2b×7. **Dactylorchis maculata** subsp. **ericetorum** × **D. traunsteineri.** A single plant having a combination of the characters of these species was noticed in Cors Erddreiniog, Anglesey, v.c. 52, in 1957. The following year several more were seen here, and in 1961 a single plant of the same form was found in a second Anglesey locality: the small calcareous bog at Rhos y Gad, near Pentraeth. At both places the putative parents are abundant and in some parts grow within 10 yards of each other.

Examination of the pollinia showed that they were poorly developed even when the flowers had opened, and the nuclei of the pollen cells were found to vary considerably in size and number, thus providing additional support for the hybrid nature of these plants.

As this hybrid does not appear to have been previously noticed, a description is given.

Stem 13-22 cm., slender, rather flexuous. Leaves 4-6 (of which 1 or 2 are non-sheathing), narrowly linear-lanceolate, subacute, slightly hooded, ± folded upwards, the lowest one or two recurved, ± faintly marked with roughly circular spots (like *ericetorum*) or unmarked. Spike 3·5-5 cm., bracts as long as the flowers. Flowers lilac-mauve, outer lateral perianth-segments ± horizontal, lightly flecked; labellum large (c. 9·5 × 12·0 mm.), with a ± cuneate base, distinctly 3-lobed with the central lobe longer than the lateral lobes, which are crenulate and well-reflexed; marked with a light pattern of reddish-purple specks and dots. Spur ± cylindrical, intermediate between the parents in thickness (width of the flattened spurs c. 2·2 mm.).—R. H. ROBERTS.

PLANT RECORDS

Compiled by E. C. Wallace

"Plant Records" are now arranged in the order given in the *List of British Vascular Plants.* (*L.B.V.P.*) By J. E. Dandy (1958).

Records are for the year 1961 where no date is given.

The following signs are used:—

§ before the *L.B.V.P.* number: to indicate that the paragraph contains information necessitating a correction to an annotated copy of the *Comital Flora.*

† before the *L.B.V.P.* number: to indicate that the plant is not a native species in the British Isles.

† before the record: to indicate a species which, though native in some parts of the British Isles, is not so in the locality recorded.

* before the record: to indicate a new vice-county record, not published previously to this issue of the *Proceedings.*

‡ before the record: to indicate a record additional to an annotated copy of the *Comital Flora*, but published elsewhere prior to the issue of the *Proceedings* in which it appears.

[ ] enclosing a record: to indicate doubt as to the validity of the record, either of identification or locality.

It will be useful if, in future, National Grid Co-ordinates, made as accurate as is thought advisable, are added to all records. These will not be published, but the original cards containing them will be filed, and may be made available for reference.

1/3. Lycopodium annotinum L. 97, Westerness; flush on the west side of Stub Coire Easain, c. 2,400 ft., 1960, J. N. Mills. 103, Mid Ebudes; Laggan Deer Forest, Loch Buie, Mull, B.S.B.I. Field Meeting, comm. A. McG. Stirling.

4/4. Equisetum variegatum Schleich. ex Weber & Mohr. 88, Mid Perth; Ben Voirlich, B.S.B.I. Field Meeting, comm. A. McG. Stirling.

4/7. Equisetum sylvaticum L. 15, E. Kent; by stream, Hunstead Wood, Chartham Hatch, 1956, F. Rose, *et al.*; only record for Kent since 1900 (1960, *Trans. Kent F.C.*, **1**, 56).

§4/9×5. Equisetum × litorale Kühlew. ex Rupr. *23 Oxon.; wet, bushy ground by pond on Nettlebed Common, N. Y. Sandwith, conf. P. Taylor.

§4/10. Equisetum telmateia Ehrh. *103, Mid Ebudes; near Mackinnon's Cave, Ardmeanach, B.S.B.I. Field Meeting, comm. A. McG. Stirling.

5/1. Osmunda regalis L. 104, N. Ebudes; cliff by waterfall near seashore, Allt Mor, Aird of Sleat, Skye, 1960, H. Milne-Redhead.

§6/1. Trichomanes speciosum Willd. *46, Cardigan; locality withheld, N. Jones, comm. Nat. Mus. Wales.

7/1. Hymenophyllum tunbrigense (L.) Sm. 103,, Mid Ebudes; wooded cliffs, Craigmure; gullies on south side of Loch Buie. Mull, B.S.B.I. Field Meeting, comm. A. McG. Stirling.

§7/2. Hymenophyllum wilsonii Hook. *112, Zetland; ravine of burn from Mill Loch, near Swining. Lunnasting, 1960, B. W. Ribbons; on rocks above Loch of Gonfirth, near Voe, with *Salix herbacea*, 1960, R. C. Palmer.

11/1. Adiantum capillus-veneris L. †17, Surrey; established in quantity on a brick railway arch, near Redhill, 1960, D. C. Kelly; apparently a hardy horticultural variety, perhaps sporulated from nearby nurseries, comm. D. P. Young.

18/2. Athyrium alpestre Clairv. 96, Easterness; among big boulders, Sgurr nan Conbhairean, 2,000 ft., 1960, H. Milne-Redhead.

21/3. Dryopteris abbreviata (DC.) Newm. 88, Mid Perth; Ben Chonzie, B.S.B.I. Field Meeting, comm. A. McG. Stirling.

22/1. Polystichum setiferum (Forsk.) Woynar. 75, Ayr; rocks in ravine. Currarie Glen, 50 ft., 1960, H. Milne-Redhead.

28/1. Botrychium lunaria (L.) Sw. 104, N. Ebudes; hill pasture, Aird of Sleat, Skye, 150 ft., 1960, H. Milne-Redhead.

§46/10. Ranunculus auricomus L. *103, Mid Ebudes; very small and non-flowering on grass basalt scree, Glen Cannel, Mull, B.S.B.I. Field Meeting, comm. A. McG. Stirling.

§46/21. Ranunculus trichophyllus Chaix. *81, Berwick; shallow loch, south-west of Doylaw, Coldingham, 1960, F. H. Perring.

56/1×2. Nuphar × spennerana Gaudin. 101, Kintyre; Loch Burnluasgan, 1960, A. G. Kenneth, det. Y. Heslop-Harrison, as *N.* × *intermedia*.

†58/7. Papaver lateritium C. Koch. 65, N.-W. York; shingle by river Swale, Great Langton, 1960, Yorkshire Nat. Union Field Meeting (1961, *The Nat.*, **1961**, 26).

§66/2. Fumaria capreolata L. *75, Ayr; Turnberry, A. McG. Stirling, conf. at Kew.

66/3. Fumaria purpurea Pugsl. 65, N.-W. York; shingle by river Swale, Kirby Fleetham, 1960, Yorkshire Nat. Union Field Meeting, det. N.Y. Sandwith (1961, *The Nat.*, **1961**, 25).

§66/10. FUMARIA PARVIFLORA Lam. *33, E. Glos.; several plants in a field of brussels sprouts on Salters Hill near Winchcombe, Miss D. S. HOBSON and Cdr. R. DUDLEY-SMITH, comm. Mrs. S. C. HOLLAND, det. N.Y. SANDWITH. Previous records were erroneous, see *Fl. Glos.*, 36 (1948).—**Ed.**

†71/1. HIRSCHFELDIA INCANA (L.) Lagr.-Foss. 45, Pembroke; abundant on a grassy bank at Milford Haven, 1960, T. A. W. Davis, conf. A. E. Wade (1960, *Nature in Wales*, **6**, 135).

§†72/2. DIPLOTAXIS TENUIFOLIA (L.) DC. 79, Selkirk; rubbish-tip, Galashiels, one plant, 1958→: *84, Linlithgow; waste ground, Carriden, near Bo'ness, E. P. BEATTIE.

94/3. DRABA INCANA L. 103, Mid Ebudes; Ton Dubh-sgairt, Ardmeanach, Mull, 500 ft., B.S.B.I. FIELD MEETING, comm. A. McG. STIRLING.

§†98/2. BARBAREA STRICTA Andrz. *56, Notts.; ditch on the road from Bawtry to Misson, W. A. SLEDGE, H. S. HARVEY and M. M. SAYER.

99/1. CARDAMINOPSIS PETRAEA (L.) Hiit. 88, Mid Perth, Ben Vorlich, B.S.B.I. FIELD MEETING, comm. A. McG. STIRLING.

102/2×1. RORIPPA × STERILIS Airy Shaw. 96b, Nairn; shingle of river Nairn near Nairn, 1960, M. McCALLUM WEBSTER, det. C. C. TOWNSEND.

§†110/1. CAMELINA SATIVA (L.) Crantz. *71, Man; rubbish-tip, Kewaigue, near Douglas, 1960, B.S.B.I. FIELD MEETING, comm. D. E. ALLEN.

113/12b. VIOLA TRICOLOR subsp. CURTISII (E. Forst.) Syme. 101 Kintyre; Kilmory Bay, Kilmory Knap, 1960, A. G. KENNETH, det. E. C. WALLACE.

§131/10. CERASTIUM ATROVIRENS Bab. *†40, Salop; railway sidings, Shrewsbury, 1959, D. E. ALLEN.

131/11. CERASTIUM PUMILUM Curt. 9, Dorset; near Worth Matravers; in some quantity, 1960, Mrs. Follett and Mrs. Yule (1961, *Proc. Dorset N.H. & Arch. Soc.*, **82**, 40.).

§133/1. STELLARIA NEMORUM L. 49, Caern.; the Caernarvonshire record of *Stellaria nemorum* in J. E. Griffith's *Flora of Anglesey and Carnarvonshire* (1895), "Coed Menai, Bangor", has never been confirmed. Repeated searches over the past few years have failed to produce the plant, although this small wood seems to have suffered little interference since Griffith's time. This year, however, a patch of *Stellaria neglecta* has been found in a sheltered spot about 15 yards outside the boundary of Coed Menai. The plants have petals somewhat larger than the sepals, the sepals and pedicels being pubescent. It seems almost certain that *S. neglecta* was what Griffith saw here and recorded as *S. nemorum;* this is more likely because there is no Caernarvonshire specimen of *S. nemorum* in the herbarium of the National Museum of Wales, in which Griffith's herbarium is incorporated, R. H. Roberts (1961, *Nature in Wales*, **7**, 68). Enclose v.c. 49 in brackets in *C.F.*—Ed.

§133/4. Stellaria neglecta Weihe. ‡44, Carm.; Llanstephan; Ferryside; near Llandfeilog, R. F. May (1961, *Nature in Wales*, **6**, 135).

§138/1. Cherleria sedoides L. *103, Mid Ebudes; Beinn Na Greine, Ardmeanach, Mull, c. 1,500 ft., B.S.B.I. Field Meeting, comm. A. McG. Stirling.

143/1. Spergularia rubra (L.) J. & C. Presl. 76, Renfrew; half a mile north-west of Kilmalcolm, 1956, Mrs. M. Crookston.

†153/2. Amaranthus hybridus L. subsp. hybridus 71, Man, Grenaby, Malew, 1959, Miss V. L. Wilson, det. J. P. M. Brenan, comm. D. E. Allen.

154/3. Chenopodium vulvaria L. 16, W. Kent; rubbish-tip, West Kent Cold Storage Works, Dunton Green, 1959, R. C. Palmer.

§154/14. Chenopodium rubrum L. *†84, Linlithgow; a few plants on waste ground, Bo'ness, E. P. Beattie.

156/5. Atriplex laciniata L. 45, Pembroke; sandy sea shore, Freshwater West, Angle, 1959, T. A. W. Davis, conf. A. E. Wade (1960, *Nature in Wales*, **6**, 19).

§163/4. Malva neglecta Wallr. *†84, Linlithgow; Bo'ness rubbish-tip, a small colony, E. P. Beattie.

§168/15. Geranium lucidum L. *71, Man; wall, Lezayre, 1960, M. B. Bing, comm. D. E. Allen. 75, Ayr; dry cliffs, Corbie Craig, near Straiton, 800 ft., 1960, H. Milne-Redhead. 88, Mid Perth; basic rock, Ben Chonzie, 2,000 ft., B.S.B.I. Field Meeting, comm. A. McG. Stirling.

§169/4. Erodium glutinosum Dumort. ‡44, Carm.; Pembrey Burrows, R. F. May (1961, *Nature in Wales*, **6**, 135). ‡49, Caern.; near Morfa Mawr farm, Morfa Dinlle, R. H. Roberts (1961, *Nature in Wales*, **6**, 139).

170/1. Oxalis acetosella L. 112, Zetland; ravine of burn flowing from Mill Loch, near Swining, Lunnasting, 1960, Mrs. F. Elder and B. W. Ribbons.

§†171/3. Impatiens parviflora DC. *85, Fife; in abundance on the rubbish-tip, West Links, St. Andrews, E. P. Beattie.

§†171/4. Impatiens glandulifera Royle. 100, Clyde Isles; Clauchland's Point, near Lamlash, Arran, 1960; increasing, 1961, J. Taylor, comm. E. P. Beattie. *104, N. Ebudes; Tarskavaig, Skye, 1960, a single plant, escaped from a croft garden, Mrs. Huntley Gordon, comm. E. P. Beattie.

†183/2. Lupinus arboreus Sims. 83, Edinb.; Borthwick, several plants, E. P. Beattie.

§†191/2. Melilotus officinalis (L.) Pall. 79, Selkirk; rubbish-tip, Galashiels, 1956→: *82, Haddington; waste ground, West Barns, Dunbar, abundant, 1956→: *84, Linlithgow; waste ground, Cam'den, Bo'ness, abundant, E. P. Beattie.

§†191/4. Melilotus indica (L.) All. *84, Linlithgow; waste ground, Carriden, Bo'ness, E. P. Beattie.

§192/4. Trifolium medium L. 71, Man; dry hedgebank south of Ballanank, Malew, 1960; remove from brackets in *C.F.*, D. E. Allen.

206/9. Vicia orobus DC. 103, Mid Ebudes; Quinish, Mull, B.S.B.I. Field Meeting, comm. A. McG. Stirling.

206/12. Vicia lutea L. 16, W. Kent; south beach, Isle of Grain, 1955, F. Rose (1960, *Bull. Kent F.C.*, **1**, 58).

207/2. Lathyrus nissolia L. 2, E. Cornwall; wayside banks, Widemouth, near Bude, 1960, D. Munro-Smith.

§†207/8. Lathyrus latifolius L. *71, Man; near The Cronk, B.S.B.I. Field Meeting, comm. D. E. Allen.

211/11 (20). Rubus umbelliformis Muell. & Lefèv. 16, W. Kent; Slade Ravine, Plumstead Common. An extension of its only known localities at the base of Shooters Hill, 1958, C. Avery and J. E. Woodhead.

211/11 (241). Rubus apiculatiformis Sudre. 16, W. Kent; Ashenbank Wood, near Cobham. An extension of its hitherto only recorded station, Jack's Wood, Shooters Hill, 1957, C. Avery and J. E. Woodhead.

211/11 (257). Rubus erubescens Wirtg. 16, W. Kent; the station on the extreme limit of Crown Woods, Shooters Hill, near Falconwood, where I first showed the plant to W. Watson in June 1950 was lost in the late fifties. Refound near Hawley's Corner, 1960, J. E. Woodhead.

†§212/8. Potentilla norvegica L. *84, Linlithgow; rubbish-tip Bo'ness, a few plants, E. P. Beattie.

212/13×15. Potentilla × italica Lehm. 45, Pembroke; grass heath on cliff top, St. Brides, 1960, T. A. W. Davis, det. A. E. Wade (1960, *Nature in Wales*, **6**, 136).

§212/14. Potentilla anglica Laichard. *82, Haddington; Aberlady Nature Reserve, quite plentiful, E. P. Beattie.

217/1. Dryas octopetala L. 97, Westerness; flush in the west side of Stub Coire Easain, c. 2,400 ft., 1960, J. N. Mills. 103, Mid Ebudes; near Mackinnon's Cave, Ardmeanach, Mull, B.S.B.I. Field Meeting, comm. A. McG. Stirling.

218/2. Agrimonia odorata (Gouan) Mill. 75, Ayr; Tairlaw Bridge, near Straiton, 450 ft., 1960, H. Milne-Redhead.

§†219/1. Aremonia agrimonoides (L.) DC. *83, Edinburgh; a fairly extensive colony in a wood at Silverknowes, Edinburgh, E. P. Beattie.

§220/2. Alchemilla conjuncta Bab. ‡†76, Renfrew; grassy roadside bank, Pollock; established since 1952; perhaps a garden escape, R. Mackechnie (1961, *Glasgow Nat.*, **18**, 147).

220/3 (2). Alchemilla vestita (Buser) Raunk. 75, Ayr; rocky north-facing gulley, Craigenreoch, 1,400 ft., 1960, H. Milne-Redhead.

§221/1. Aphanes arvensis L. *71, Man; Chapel Hill, Balladoole, 1960, D. E. Allen, conf. S. M. Walters.

†224/1. Acaena anserinifolia (J. R. & G. Forst.) Druce. 61, S.-E. York; disused runway, Riccal Airfield, Rev. P. M. Garnett; Skipwith Common, Hull Naturalists', comm. E. Crackles (1961, *The Nat.*, **1961**, 26).

†225/3. Rosa multiflora Thunb. 22, Berks.; abundant in hedgerow near Aston Tirrold, Mrs. E. Hodgson, det. R. Melville.

225/15×14. Rosa micrantha × rubiginosa. 22, Berks.; chalk grassland near Aston Tirrold, Mrs. E. Hodgson, det. R. Melville.

§†226/2. Prunus domestica L. *82, Haddington; hedge, North Hedderwick, Dunbar; East Linton: 83, Edinb.; hedge near Balerno: *84, Linlithgow; hedge near Bo'ness, E. P. Beattie.

§†227/2. Cotoneaster simonsii Bak. *84, Linlithgow; waste ground, Bo'ness, one large bush, E. P. Beattie.

§†227/3. Cotoneaster horizontalis Decne. *83, Edinb.; railway embankment near Davidson's Mains, Edinburgh, E. P. Beattie.

§232/5(1). Sorbus aria (L.) Crantz. *†83, Edinb.; several young trees established by roadside, Dreghorn, Edinburgh—not planted, E. P. Beattie.

§232/5(7). Sorbus rupicola (Syme) Hedl. *103 Mid Ebudes; near Mackinnon's Cave, Ardmeanach, Mull, on calcareous sea-cliffs, B.S.B.I. Field Meeting, comm. A. McG. Stirling.

§235/12. Sedum villosum L. 79, Selkirk; rocky side of burn, Buccleuch, 850 ft., 1960: 80, Roxburgh; wet moorland, Long Moss, 1960, H. Milne-Redhead. *103, Mid Ebudes; Beinn na Greine, Ardmeanach, Mull, c. 1,500 ft., B.S.B.I. Field Meeting, comm, A. McG. Stirling.

247/2. Drosera anglica Huds. 75, Ayr; Long Moss, near Lugar, A. McG. Stirling.

247/3. Drosera intermedia Hayne. 75, Ayr; gravelly shore, Loch Maberry, 400 ft., 1960, H. Milne-Redhead.

§254/5. Epilobium roseum Schreb. *112, Zetland; Lerwick, in two places, 1960, R. C. Palmer, conf. E. F. Warburg.

§†254/6. Epilobium adenocaulon Hausskn. ‡44, Carm.; rubbish-tip, Pembrey, 1960, R. F. May (1961, *Nature in Wales*, **6**, 135). 48, Mer.; at Dolgellau, this species has now crossed the river Wnion below Dr. William's School and established itself on the roadside by Pandy'r Odyn, and it has also spread for some distance along the sides of the road leading towards the golf course from the railway station; reservoir in the Aran Glen, near Dolgellau, in quantity, 1960, P. M. Benoit (1961, *Nature in Wales*, **6**, 137). *71, Man; Kewaigue dump, near Douglas; roadside by St. Trinians, 1960, B.S.B.I. Field Meeting, comm. D. E. Allen.

254/9. Epilobium obscurum Schreb. 112, Zetland; various places in Lerwick, 1960, R. C. Palmer.

§†254/13. Epilobium nerterioides Cunn. ‡16, W. Kent; Tunbridge Wells, 1956, K. E. Bull; Pembury Walks, 1956, C. Stace (1960, *Bull. Kent F.C.*, **1**, 59). *111, Orkney; disused Naval Dockyard, Lyness, Hoy, 1959, Miss E. R. Bullard. ‡H21, Dublin; wall between railway and Burrow Road Station, 1954 (1961, *Suppl. to Colgan's Flora of Co. Dublin*, 27).

§258/2. Circaea intermedia Ehrh. *71, Man; Cragga Glen, B.S.B.I. Field Meeting, conf. P. H. Raven. *75, Ayr; Penhill Burn, near Old Dailby, A. McG. Stirling. *103, Mid Ebudes; frequent in Mull, as at Carsaig and Balmeanach, Ardmeanach, B.S.B.I. Field Meeting, comm. A. McG. Stirling. 104, N. Ebudes; wooded ravine, Allt Mor, Aird of Sleat, Skye, 1960, H. Milne-Redhead.

262/4. Callitriche intermedia Hoffm. 75, Ayr; submerged in Cammock Burn, near Barrhill, 530 ft., 1960, H. Milne-Redhead.

262/5. Callitriche hermaphroditica L. 73, Kirkcudbr.; Loch Kindar, abundant, 80 ft., 1960, H. Milne-Redhead.

§300/7. Oenanthe fluviatilis (Bab.) Colem. ‡61, S.-E. York; river Hull, Driffield, 1960, Yorkshire Nat. Union Field Meeting (1961, *The Nat.*, **1961**, 25).

§319/16. Euphorbia cyparissias L. ‡†36, Hereford; Great Doward, 1960 (1961, *Trans. Woolhope Field Nat. Club*, **36**, 371).

320/5. Polygonum viviparum L. 96, Easterness; moraine mound, Dalchreichart, 400 ft., 1960, H. Milne-Redhead.

§320/11. Polygonum nodosum Pers. *71, Man; beside river Dhoo, Union Mills, 1960, B.S.B.I. Field Meeting; stream, Strandhall, D. E. Allen.

†320/22. Polygonum campanulatum Hook. f. 3, S. Devon; growing in a stream in a wood, Lustleigh, 1960, A. J. Davey and M. Gould, det. at Kew.

§325/1(3). Rumex tenuifolius (Wallr.) Löve. ‡21, Middx.: Kensington Gardens, in natural turf, 1960, D. E. Allen, conf. J. E. Lousley (1961, *Lond. Nat.*, **40**, 21).

†328/3. Urtica pilulifera L. 17, Surrey; garden weed, Wandsworth, one plant, 1960; at least five plants, 1961, I. C. Price, det. at Kew.

§342/3. Populus tremula L. *82, Haddington; Keith Mains, 1955, R. W. Barker.

343/9× ? Salix × stipularis Sm. 83, Edinburgh; two bushes on bank of Union Canal near Sighthill, E. P. Beattie.

343/11×9. Salix × laurina Sm. 82, Haddington; Biel Burn, West Barns, Dunbar, a few large bushes: 83, Edinburgh; bank of river Almond, Cramond Bridge, one bush, E. P. Beattie.

343/15. Salix phylicifolia L. 75, Ayr; Glen Water, Darvel; Glenmuir Water, Lugar, locally abundant, A. McG. Stirling.

343/18. Salix lanata L. 96, Easterness; damp, crumbling, basic rocks, Sgurr nan Conbhairean, 1960, H. Milne-Redhead, conf. R. D. Meikle.

350/1. Andromeda polifolia L. 75, Ayr; Low Moss, near Lugar; west end of Airds Moss, A. McG. Stirling.

§358/4. Vaccinium oxycoccos L. *71, Man; large patch by stream below Slieau Managh, 1960, G. E. Quayle, comm. D. E. Allen.

§359/1. Pyrola minor L. *9, Dorset; near Moreton, H. J. M. Bowen. 12, N. Hants; wood near Ewshott, with *Epipactis purpurata* and *Hypericum androsaemum*, Miss V. M. Leather.

360/1. Orthilia secunda (L.) House. 96, Easterness; damp rock ledges, Sgurr nan Conbhairean, 1960, H. Milne-Redhead.

§370/2. Lysimachia nummularia L. ‡78, Peebles; small patch by river Tweed between Peebles and Neidpath Castle, 1956, E. P. Beattie. But see *Top. Bot. Suppl.*, 1.—Ed.

385/1. Gentianella campestris (L.) Börner. 75, Ayr; pastures near Standard, Feoch Burn, near Barrhill, 450 ft.: 96, Easterness: moraine by river Moriston, Dalchreichart, 400 ft.: 104, N. Ebudes; hill pasture, Aird of Sleat, Skye, 200 ft., 1960, H. Milne-Redhead.

389/2. Cynoglossum germanicum Jacq. [16, W. Kent; now well established at Pilgrim's Way, Ryarsh, from seed from Mickleham, Surrey, in 1958. It has flowered well this year (1961), and its progress is being carefully watched, F. Rose.]

392/2×1. Symphytum × uplandicum Nyman. *82, Haddington several plants near Aberlady, and in other places throughout the county: *83, Edinburgh; abundant at Cramond Bridge, Barnton: *84, Linlithgow; abundant on the banks of the river Almond at Kirkliston and Turnhouse: 88, Mid Perth; abundant near ruined cottage near Dalguise; island in river Tay near Dalguise, E. P. Beattie.

†392/3. Symphytum orientale L. 61, S.-E. York; near Great Givendale, 1957, G. A. Nelson.

§392/6. Symphytum tuberosum L. *†15, E. Kent; Hawkin's Rough, Chilham, 1945, D. H. Kent: wood clearing near Barham, Miss D. A. C. Long, det. A. E. Wade.

†392/7. Symphytum grandiflorum DC. 22, Berks.; roadside verge, Sparsholt, abundant, Mrs. E. Hodgson, det. A. E. Wade.

†394/1. Trachystemon orientale (L.) G. Don. 83, Edinburgh, Mortonhall, Edinburgh, a large patch, 1960, E. P. Beattie.

†413/R. Solanum rostratum Dunal. 6, N. Som.; garden weed, Welshmill Hill, Frome, Mrs. N. Wycherley, det. C. C. Townsend, comm. P. F. Hunt.

†415/1. Datura stramonium L. 59, S. Lancs.; waste ground, Manchester University, 1960, J. N. Mills.

†418/1. Antirrhinum majus L. 79, Selkirk; Galashiels rubbish-tip: 80, Roxburgh; rubbish-tip, Melrose; 82, Haddington; rubbish-tip, North Berwick: 83, Edinburgh; plentifully established on rocky slopes of Carlton Hill, Edinburgh: 84, Linlithgow; Bo'ness rubbish-tip: 85, Fife; rubbish-tip, West Links, St Andrews, E. P. Beattie.

§420/4. Linaria vulgaris Mill. *110, Outer Hebrides; Collanish, 1959, R. G. B. Roe.

§430/3. Veronica catenata Pennell. *82, Haddington; a few plants in a burn, Yellow Craig Wood, Dirleton, E. P. Beattie.

435/1(10). EUPHRASIA CURTA (Fr.) Wettst. 112, Zetland; slopes above sea, Hamna Voe, Northmaven, 1960, B.S.B.I. FIELD MEETING, det. E. F. WARBURG, as f. *piccola* Towns.

§435/1(15). EUPHRASIA CONFUSA Pugsl. ‡15, E. Kent; Gossy Banks, north-east of Hythe; Sandling Park, L. J. Margetts, det. E. F. Warburg (1960, *Trans Kent. F.C.*, **1**, 60).

441/1. PINGUICULA LUSITANICA L. 75, Ayr; wet moorland, Fence of Knockdon, 750 ft., 1960: 104, N. Ebudes; boggy ground near Point of Sleat, Skye, 100 ft., 1960: 105, W. Ross; wet hill slope, An Cromallt, above Iron Lodge, 650 ft., 1960, H. MILNE-REDHEAD.

442/4. UTRICULARIA MINOR L. 112, Zetland; in flower by lochan at Newton, on road from Bridge of Walls to West Burrafirth, 1960, Miss E. BYERS; believed to be the first record of its having flowered in Shetland, R. C. PALMER.

§445/3×4. MENTHA × VERTICILLATA L. *71, Man; ley by branch of Silverburn, south-south-west of Ballamodha, 1960, B.S.B.I. FIELD MEETING, conf. R. M. HARLEY.

445/6×7. MENTHA × NILIACA Juss. ex Jacq. *71, Man; Ballafesson, near Port Erin, 1960, D. E. ALLEN, conf. R. M. HARLEY.

446/1. LYCOPUS EUROPAEUS L. 104, N. Ebudes; Camas Daraich, near Point of Sleat, Skye, 10 ft., 1960, H. MILNE-REDHEAD.

459/6×7. STACHYS × AMBIGUA Sm. 48, Mer.; roadside near the Victoria Hotel, Llanbedr, with the parents, 1958; and on the banks of the stream at Bontddu, near *S. sylvatica*, 1958, highly sterile in both localities, P. M. Benoit (1959, *Nature in Wales*, **5**, 737). On the side of a minor road close to Bontnewydd railway station, very similar to, and growing with, *S. palustris*; *S. sylvatica* nearby, 1959, P. M. BENOIT. On the side of the main Bala-Corwen road at Sarnau, without either parent, 1959, B.S.B.I. FIELD MEETING.

469/2. SCUTELLARIA MINOR Huds. 103, Mid Ebudes; near Garmony, Craigmure, Glen Cannel, Mull, B.S.B.I. FIELD MEETING, comm. A. McG. STIRLING.

§473/1. LITTORELLA UNIFLORA (L.) Aschers. *78, Peebles; Talla Reservoir, 1960, F. H. PERRING.

§†475/5. CAMPANULA PERSICIFOLIA L. *79, Selkirk; roadside, Faldonside, several plants, E. P. BEATTIE.

§485/6. GALIUM PUMILUM Murr. 88, Mid Perth; basic rocks, Ben Chonzie, B.S.B.I. FIELD MEETING, comm. A. McG. STIRLING. *103, Mid Ebudes; basalt cliffs, Balmeanach, Ardmeanach, Mull, B.S.B.I. FIELD MEETING, comm. A. McG. STIRLING.

§494/2. Valerianella carinata Lois. ‡46, Card.; garden weed, Ynyshir, Eglwysfach, P. M. Benoit (1961, *Nature in Wales*, **7**, 67). ‡48, Mer.; side of the Dolgellau road, just outside Barmouth, P. M. Benoit (1961, *Nature in Wales*, **7**, 68).

§†503/2. Galinsoga ciliata (Raf.) Blake. ‡5, S. Som.; garden, West Monkton, 1959, Mrs. D. V. Sansome (1960, *Proc. Som. Arch. & N.H.S.*, **104**, 152).

506/2 × 1. Senecio × ostenfeldii Druce. 6, N. Som.; fen meadows, Gordano Valley, 1960, A. J. Willis (1961, *Proc. Bristol Nat. Soc.*, **30**, 17).

§512/4. Inula conyza DC. *82, Haddington; between the golf course and the sea, Dirleton, four plants growing among young pine trees, E. P. Beattie.

§521/1. Erigeron acer L. *82, Haddington; about one hundred and fifty plants scattered over a small area of the links and dunes near Dirleton. E. P. Beattie. *103, Mid Ebudes; calcareous rocks near Carsaig, Mull, B.S.B.I. Field Meeting, comm. A. McG. Stirling.

§†522/1. Conyza canadensis (L.) Cronq. *40, Salop; railway sidings, Shrewsbury, 1959, D. E. Allen.

§†534/1. Cotula coronopifolia L. ‡H.3, W. Cork; boggy, partly inundated ground near the shore at Coulagh Bay, north-west of Castletown Bere, R. P. Maybin, det. D. A. Webb (1961, *Irish Nat. J.*, **13**, 262).

543/1. Saussurea alpina (L.) DC. 96, Easterness; mountain cliffs, Sgurr nan Conbhairean, 2,000 ft., 1960, H. Milne-Redhead.

549/3. Hypochoeris maculata L. 32, Northants; The Roughs, near Southorpe, K. G. Messenger, comm. I. Hepburn.

†557/3. Cicerbita macrophylla (Willd.) Wallr. 6, N. Som.; Chantry, near Frome, Mrs. N. Wycherley (1961, *Proc. Bristol Nat. Soc.*, **30**, 112). 9, Dorset; Morecombelake, 1960, Miss J. Gardiner (1961, *Proc. Dorset N.H. & Arch. Soc.*, **82**, 40). 65, N.-W. Yorks; roadside, Wallerby, near Northallerton, 1960, C. M. Rob (1961, *The Nat.*, **1961**, 27). 79, Selkirk; sewage works, Selkirk, abundant; 83, Edinburgh; roadside, Burdiehouse, and near Straiton, plentiful, E. P. Beattie.

558/1(98). Hieracium exotericum Jord. ex Bor. *†71, Man; Lonan Churchyard, probably introduced with grass seed, 1958, D. E. Allen, det. P. D. Sell and C. West.

558/1(163). Hieracium strumosum (W. R. Linton) A. Ley. *13, W. Sussex; lane from Lower Beeding to Plummer's Plain, 1960; 14, E. Sussex; chalky bank by London road near Patcham, 1955, R. C. Palmer, both det. P. D. Sell and C. West.

559/8. CREPIS PALUDOSA (L.) Moench. 57, Derby; very abundant on little cliffs above the stream, Alport Dale, J. N. MILLS.

567/1. HYDROCHARIS MORSUS-RANAE L. 41, Glam.; abundant in the quarry pool, Penylan Hill, Cardiff. Long thought to have been extinct in the county, 1959, A. E. Wade (1961, *Trans. Cardiff Nat. Soc.*, **88**, 21).

§576/2. ZOSTERA ANGUSTIFOLIA (Hornem.) Reichb. ‡45, Pemb.; forms a narrow discontinuous belt for 400 yards in the upper reaches of Sandy Haven, Pill, 1958, M. George, det. T. G. Tutin (1961, *Nature in Wales*, **7**, 21). *82, Haddington; abundant in Tynninghame, Aberlady and Gosford Bays, E. P. BEATTIE, conf. T. G. TUTIN.

605/20. JUNCUS ALPINOARTICULATUS Chaix. 80, Roxburgh; marshy ground, Branxholme, Wester Loch, 900 ft., 1960, H. MILNE-REDHEAD, conf. P. W. RICHARDS.

625/7. EPIPACTIS ATRORUBENS (Hoffm.) Schult. 57, Derby; Gardoms Edge, broken rocky slopes, on millstone grit, 1959, J. N. MILLS.

§628/2. LISTERA CORDATA (L.) R.Br. 97, Westerness; shaded mossy rock ledge, Easter Glen, Quoich Burn, 850 ft., 1960, H. MILNE-REDHEAD. *H.9, Clare; Black Head, 1959, C. D. PIGOTT.

635/1. COELOGLOSSUM VIRIDE (L.) Hartm. 75, Ayr; hill pasture, Laggan, near Barrhill, 550 ft., 1960: 96, Easterness; rocky ledges, Sgurr nan Conbhairean, 1960, H. MILNE-REDHEAD.

637/1. LEUCORCHIS ALBIDA (L.) E. Mey. ex Schur. 96, Easterness; moraine by river Moriston, Dalchreichart, 400 ft., 1960: 104, N. Ebudes; hill pasture, Aird of Sleat, Skye, 150 ft., 1960, H. MILNE-REDHEAD.

§640/3. OPHRYS SPHEGODES Mill. *1, W. Cornwall; one plant on fixed dunes, Hayle, Miss J. ALLISON, det. V. S. SUMMERHAYES, comm. P. F. HUNT.

641/1. HIMANTOGLOSSUM HIRCINUM (L.) Spreng. 14, E. Sussex; near Camber Links, a magnificent plant, 1960, Mrs. Head (1961, *Hastings & E. Sussex Nat.*, **9**, 145).

642/4. ORCHIS USTULATA L. 6, N. Som.; a single plant in short limestone turf, Callow Rocks, Sidcot, J. HODGSON.

643/1b. DACTYLORCHIS FUCHSII subsp. OKELLYI (Druce) Vermeul. 71, Man; lead-mine heap, The Eairy, 1960, B.S.B.I. FIELD MEETING, conf. P. F. HUNT and R. D. MEIKLE, comm. D. E. ALLEN: frequent in *Caricetum distichae* in alluvial meadowland near Strandhall; Ballalough Curragh, near Peel, 1960, D. E. ALLEN.

643/3. DACTYLORCHIS INCARNATA (L.) Vermeul. 75, Ayr; hill bog on boulder clay, Knockinculloch, 950 ft., 1960, H. MILNE-REDHEAD.

§652/3. Sparganium angustifolium Michx. *103, Mid Ebudes; Loch Peallach, Tobermory, Mull, B.S.B.I. Field Meeting, comm. A. McG. Stirling.

657/1. Blysmus compressus (L.) Panz. ex Link. 79, Selkirk; hill spring by Woo Burn, 800 ft., 1960, H. Milne-Redhead.

§660/1. Rhynchospora alba (L.) Vahl. ‡45, Pemb.; wet moor on Mynydd Carningli, 1960, T. A. W. Davis (1961, *Nature in Wales*, **6**, 136). 73, Kirkcudbr.; Rascarrel Moss, Auchencairn, with *Andromeda polifolia*: 75, Ayr; Low Moss, near Lugar; west end of Aird's Moss, A. McG. Stirling. *109, Caithness; bog near Loch Rhuard, 1955, M. McC. Webster.

663/1. Carex laevigata Sm. 75, Ayr; damp woodland by Feoch Burn, near Barrhill, 300 ft., 1960, H. Milne-Redhead.

663/2. Carex distans L. 103, Mid Ebudes; shore near Balmeanach, Ardmeanach, Mull, B.S.B.I. Field Meeting, comm. A. McG. Stirling.

§663/7. Carex lepidocarpa Tausch. *75, Ayr; basic flush near Dalfask, Assel Water, Girvan, A. McG. Stirling.

663/12. Carex sylvatica Huds. 103, Mid Ebudes; Balmeanach, Ardmeanach; near Glenforsa, Mull, B.S.B.I. Field Meeting, comm. A. McG. Stirling. 104, N. Ebudes; damp rocks overhanging sea cliff, Tarskavaig, Skye, 5 ft., 1960, H. Milne-Redhead.

663/19. Carex saxatilis L. 96, Easterness; wet alpine slopes, Sgurr nan Conbhairean, 3,000 ft., 1960: 106, E. Ross; alpine rivulet, An Riabhachan, 2,250 ft., 1960, H. Milne-Redhead.

§663/21. Carex acutiformis Ehrh. ‡87, W. Perth; near Lake of Menteith, in small quantity, 1959, R. Mackechnie (1961, *Glasgow Nat*, **18**, 147).

663/28. Carex limosa L. 74, Wigtown; Lochs of High Derry, 450 ft.: 75, Ayr; near Eyes Loch, 625 ft.,; Baing Loch, 875 ft.; Widow's Loch, 875 ft., 1960: 96, Easterness; lochans draining into Allt Ruigh Fhearadair, 750 ft., 1960: 97, Westerness; Lochan an Fhigheadair, 750 ft., 1960: 104, N. Ebudes; Loch Horaveg, Sleat, Skye, 350 ft., 1960, H. Milne-Redhead.

§663/29. Carex paupercula Michx. 72, Dumfries; boggy moorland, Lime Knowe, near Moodlaw Loch, 1,275 ft., 1960, H. Milne-Redhead. 79, Selkirk; bog, Kingside Loch, 1,150 ft., 1960, E. & H. Milne-Redhead and V. S. Summerhayes. *103, Mid Ebudes; hills on south side of Loch Bure, Mull, B.S.B.I. Field Meeting, comm. A. McG. Stirling.

663/33. Carex lasiocarpa Ehrh. 74, Wigtown; edge of Pulganny Burn, 400 ft., 1960: 75, Ayr; Baing Loch, 875 ft., 1960; 80, Roxburgh;

Branxholme Wester Loch, 875 ft., 1960: 96, Easterness; lochans draining into Allt Ruagh Fhearadair, 750 ft., 1960, H. Milne-Redhead. ‡87, W. Perth; near Lake of Monteith, in small quantity, 1959, R. Mackechnie (1961, *Glasgow Nat.*, **18**, 147). 97, Westerness; Lochan an Fhigheadair, 750 ft., 1960: 105, W. Ross; lochan at foot of An Cruachan, 1960, H. Milne-Redhead.

663/57. Carex otrubae Podp. 104, N. Ebudes; salt marsh, Camas Daraich, near Point of Sleat, Skye, 5 ft., 1960, H. Milne-Redhead.

§664/1. Leersia oryzoides (L.) Sw. ‡5, S. Som.; growing along the banks of the Taunton-Bridgewater Canal, over a distance of four miles, Capt. R. G. B. Roe (1960, *Proc. Som. Arch. & N.H.S.*, **104**, 153).

§669/3. Glyceria declinata Bréb. 79, Selkirk; cattle-trampled ground, Buccleuch, 850 ft., 1960, E. and H. Milne-Redhead and V. S. Summerhayes. *103, Mid Ebudes; marsh near shore, Quinnish, Mull, B.S.B.I. Field Meeting, comm. A. McG. Stirling.

670/4. Festuca altissima All. 71, Man.: delete all records given in *Proc. B.S.B.I.*, 3, 417 (1960), D. E. Allen.

§†670/5. Festuca heterophylla Lam. ‡6, N. Som.; in a plantation of pine and larch near Longmead, Monkton Combe, 1959, N. Jardine, det. F. H. Perring (1961, *Proc. Bristol Nat. Soc.*, **30**, 111).

§†671/3. Lolium temulentum L. *82, Haddington; rubbish-tip, North Berwick, E. P. Beattie.

§672/3. Vulpia myuros (L.) C. C. Gmel. *†95, Moray; railway tracks, Forres, M. McC. Webster.

676/4. Poa alpina L. 96, Easterness; damp alpine slopes, Sgurr nan Conbhairean, 2,250 ft., 1960, H. Milne-Redhead.

§676/14. Poa palustris L. *40, Salop; wet rushy meadow, The Yesters, east of Baschurch, 1961, F. H. Perring: disused brickpit, near Halfway House, Westbury, 1961, C. Sinker, both apparently native, F. H. Perring. 62, N.-E. York; Topcliffe station, 1960, C. M. Rob (1961, *The Nat.*, **1961**, 27).

§†676/15. Poa chaixii Vill. ‡6, N. Som.; Ammerdown Park, near Kilmersdon, growing under semi-naturalised conditions in coppiced oak-ash-hazel woodland, 1959, N. Jardine, det. F. H. Perring (1961, *Proc. Bristol Nat. Soc.*, **30**, 110).

681/2. Melica nutans L. 75, Ayr; shady rocky, bank of burn, Dalquhairn Bridge, 600 ft., 1960, H. Milne-Redhead.

§686/1. Elymus arenarius L. *†17, Surrey; sandy ground on rifle-range, Ash Common, Ash Vale, Miss V. M. Leather. *74, Wigtown; Point of Lag, Monteith; Knock Bay, Portpatrick, A. McG. Stirling.

§687/1. HORDEUM SECALINUM Schreb. ‡45, Pemb.: on the bank of a stream at the upper limit of salt-marsh, St. Ishmael's, 1960, T. A. W. Davis, 1960 (1961, *Nature in Wales*, **6**, 136).

†692/1. AVENA FATUA L. 112, Zetland; in several fields, Culswick, Sandsting, 1960, R. C. PALMER.

700/3. CALAMAGROSTIS STRICTA (Timm) Koel. 79, Selkirk: Ashkirk Loch, 900 ft., 1960, H. MILNE-REDHEAD. 80, Roxburgh; Alemoor Loch, 900 ft., 1960, H. MILNE-REDHEAD and V. S. SUMMERHAYES; Blackpool Moss, near Selkirk, 800 ft., 1960, H. MILNE-REDHEAD.

§702/1. APERA SPICA-VENTI (L.) Beauv. *†79, Selkirk; Galashiels Sewage Works, several plants, E. P. BEATTIE.

§708/1. ALOPECURUS MYOSUROIDES Huds. *†112, Zetland; rubbish-tip, Lerwick, 1960, R. C. PALMER and W. SCOTT.

714/1. PARAPHOLIS STRIGOSA (Dumort.) C. E. Hubbard. 73, Kirkcudbr.; Nerrick shore, near Orroland—probably the original Kirkcudbright locality, A. McG. STIRLING.

§716/1. SPARTINA MARITIMA (Curt.) Fernald. ‡16, W. Kent; on bare mud with *S.* × *townsendii*, St. Mary's Bay, St. Mary Hoo, 1958, Kent F.C. Excursion (1960, *Trans. Kent F.C.*, **1**, 64).

§716/2×1. SPARTINA × TOWNSENDII H. & J. Groves. ‡H.31, Louth; Black rock, Dundalk Bay, plentiful 1957, R. C. Davidson: ‡H.38, Down; Ringneill, Strangford Lough, many clumps, apparently not planted but spreading northward by natural means, E. N. Carruthers (1960, *Irish Nat. J.*, **13**, 188).

§NITELLA FLEXILIS Ag. ‡57, Derby; Allestree Park lake, 1955, S. Hilton and G. J. Parrott (1961, *Trans. Derby N.H.S.*, **2**, 14).

ABSTRACTS FROM LITERATURE

Compiled by D. H. Kent

Thanks are due to E. B. Bangerter, Mrs. S. P. Phillips and A. E. Wade for their assistance.

SYSTEMATIC

1. Lycopodium. Wilce, J. H., 1961, Lycopodium complanatum L. and four new allied species of the Old World, *Nova Hedwigia*, **3**, 93-117. *Lycopodium complanatum* is usually treated as a polymorphic species with numerous infraspecific taxa and a ± cosmopolitan distribution.

The species as originally described by Linnaeus is not represented in the Linnean herbarium, and plants so labelled in that collection do not conform to the Linnean description. *L. complanatum* is, therefore, redescribed from typical Scandinavian material. In addition four new species, formerly included under *L. complanatum* sensu lato, are described from the southern hemisphere.—[D.H.K.]

3/2. Isoetes echinospora Durieu. Boivin, B., 1961, Isoetes echinospora Durieu in North America, *Amer. Fern J.* **51**, 83-85. The N. American variants of *Isoetes echinospera* are generally distinguished by the presence of stomata, whereas plants from Europe invariably lack stomata.

The N. American plant is accordingly designated as *I. echinospora* subsp. *muricata* (Dur.) Boivin, stat. nov. A number of varieties are also described.—[D.H.K.]

4. Equisetum. Hauke, R.L., 1961. A resumé of the taxonomic reorganisation of Equisetum, subgenus Hippochaete, *Amer. Fern J.* **51**, 131-137.

4→ Sphenopsida. Hadac, E., 1961, The pteridophyta of Iraq, *Bull. Iraq Nat. Hist. Mus.*, **1** (3), 1-12. Descriptions are given of the Sphenopsida found in Iraq, and a key provided to their identification. A number of British species occur, among which may be mentioned *Asplenium ruta-muraria*, *A. trichomanes* and *Cystopteris regia*, all of which are very rare in the country, are confined to mountains and have only recently been discovered.—[D.H.K.]

4→ Sphenopsida. Löve, A. & D., 1961, Some chromosome numbers of Icelandic ferns and fern allies, *Amer. Fern J.*, **51**, 127-128. The following chromosome numbers are given from counts on Icelandic material:—*Selaginella selaginoides* $2n=18$, *Equisetum arvense* $2n=216$, *E. pratense* $2n=216$, *E. fluviatile* $2n=216$, *E. hyemale* $2n=216$, *E. variegatum* $2n=216$, *Botrychium lunaria* $2n=90$, *Thelypteris* (*Gymnocarpium*) *dryopteris* $2n=160$, *Asplenium viride* $2n=72$, *Athyrium filix-femina* $2n=80$, *Woodsia ilvensis* $2n=82$, *W. alpina* $2n=164$, *Cystopteris fragilis* $2n=168$, *Polystichum lonchitis* $2n=82$, *Dryopteris abbreviata* $2n=82$, *D. dilatata* $2n=164$, *Blechnum spicant* $2n=168$ and *Polypodium vulgare* $2n=148$.—[D.H.K.]

8/1. PTERIDIUM AQUILINUM (L.) Kuhn. Poel, L. W., 1961, Soil aeration as a limiting factor in the growth of Pteridium aquilinum (L.) Kuhn, *J. Ecol.*, **49**, 107-111.

11/1. ADIANTUM CAPILLUS-VENERIS L. Verma, S.C. and Loyal, D. S., 1961, Colchi-autotetraploidy in Adiantum capillus-veneris, *Nature*, **188**, 1210-1211.

15. ASPLENIUM. Meyer, D. E., Zur Zytoologie der Asplenien Mitteleuropas (XXIV-XXVII), *Ber. Deutsch. Bot. Ges.*, **73**, 386-394.

15. ASPLENIUM. Meyer, D. E., 1960, Über Typus-Exemplare von Asplenium-Bastarden Mitteleuropa, *Willdenowia*, 2, 519-531.

15/7 × 14/1. ASPLENIUM RUTA-MURARIA × PHYLLITIS SCOLOPENDRIUM. Vida, G., 1960, Ein neuer intergenerischer Farnbastard, *Acta Bot. Hung.*, **6**, 427-432. A new intergeneric fern hybrid—*Asplenium ruta-muraria* × *Phyllitis scolopendrium* is described from Hungary under the name × *Asplenophyllitis kummerlei* hybr. nov.—[D.H.K.]

19. CYSTOPTERIS. Hagenah, D. J., 1961, Spore studies in the genus Cystopteris, 1. The distribution of Cystopteris with non-spiny spores in N. America, *Rhodora*, **63**, 181-193.

20/2. WOODSIA ALPINA (Bolton) Gray. Nieschalk, A., 1960, Woodsia alpina Gray—neu für Bayern, *Ber. Bayer. Bot. Ges.*, **33**, 104.

21. DRYOPTERIS. Britton, D., The problems of variation in North American Dryopteris, *Amer. Fern J.* **51**, 23-30.

21. DRYOPTERIS. Crane, F. W., 1960, A key to American Dryopteris species based on characters of the perispore. *Amer. Fern J.*, **50**, 270-275.

21. DRYOPTERIS. Walker, S., 1961, Cytogenetic studies in the Dryopteris spinulosa complex, 2, *Amer. J. Bot.*, **48**, 607-614. A comparison of the *Dryopteris lanceolatocristata* (*spinulosa*) complex, as represented in N. America, is made with that in Europe. Although in N. American, other *Dryopteris* species are known to hybridise with members of the complex, the report has been limited to species which compare directly with those in Europe.

Three tetraploid species and two diploid species, the latter representing at least one ancestral genome in the complex, are discussed together with the interspecific hybrids.

Synthetic hybrids have been produced, involving taxa from both sides of the Atlantic. Evidence from these hybrids suggests that *D. intermedia* of N. America and *D. maderensis*, of Madeira, are conspecific.—[Author's summary].

22. POLYSTICHUM. Meyer, D. E., 1959, Polystichum × eberlei (P. braunii × lonchitis) ein neuer Farnbastard, *Nova Hedwigia*, **1**, 105-114

22. POLYSTICHUM. Meyer, D.E., 1959, Einer neuer Farnbastard gefunden: Polystichum braunii × lonchitis, *Die Naturwiss.*, **46**, 237-238.

24. THELYPTERIS. Root, E.E., 1961, Hybrids in North American Gymnocarpiums, *Amer. Fern J.*, **51**, 15-22. A study of N. American material of *Thelypteris* (*Gymnocarpium*) *dryopteris* and *T.* (*G.*) *robertiana* and apparent intermediates has revealed only one gathering which may be of hybrid origin.

The differences between the two species and the possible hybrid are given below.

	T. dryopteris	*Intermediate*	*T. robertiana*
Characteristic frond shape	Broadly triangular: two lower pinnae about ¾ as long as remainder of frond or longer	Two lower pinnae about ½ to ¾ as long as remainder of frond	Narrowly triangular: two lower pinnae about ½ as long as remainder of frond
Indumentum of frond and rachis	Very sparse	Moderate	Very dense
Shape of epidermal cells (average)	Margins deeply sinuate	Margins moderately sinuate	Margins shallowly sinuate

—[D.H.K.]

25/1. POLYPODIUM VULGARE L. Villaret, P., 1960, le Polypodium vulgare L. subsp. serratum (Willd.) Christ en Suisse, *Bull. Soc. Vaudoise Sci. Nat.*, **67**, 323-331.

32/1. LARIX DECIDUA Mill. Roten, F., 1960, Le Mélèze á la limite de son aire naturelle de dispersion et les problèmes posés par son traitement et son rejeunissement, *Bull. Murith.*, **77**, 1-7. The distribution of the larch in the Valais is studied and related to factors such as rainfall, mists, light altitude and late frosts.—[E.B.B.]

33/1. PINUS SYLVESTRIS L. Henman, D., 1961, Natural regeneration of Scots Pine Woods in the Highlands, *Scot. For.*, **15**, 235-242.

33/C. CHAMAECYPARIS. Ferré, Y. de and Rouane, P., 1960, Formes horticoles de Thuya et de Chamaecyparis, *Bull. Soc. Hist. Nat. Toulouse*, **95**, 287-302. A key to the species of *Chamaecyparis* and *Thuja* is given. The cultivated varieties of these species are then considered under the headings of variation in: 1, type of leaf; 2, phyllotaxy and branching; 3, size; 4, habit; 5, colour.—[E.B.B.]

33/T. THUJA.—See 33/C. CHAMAECYPARIS.

34. JUNIPERUS. McVean, D. N., 1961, Post-glacial history of Juniper in Scotland, *Proc. Linn. Soc.*, **172**, 53-56.

38. HELLEBORUS. Merxmüller, H. & Podlech, D., 1961, Uber die europäischen Vertreter von Helleborus sect. Helleborus, *Fedde. Rep.* **64**, 2-11. A revision of *Helleborus* in Europe in connexion with 'Flora Europaea'.—[D.H.K.]

46/10. RANUNCULUS AURICOMUS L. Marklund, G., 1961, Der Ranunculus auricomus-Komplex in Finnland, 1. Diagnosen und Fundorstslisten einiger Sippen des R. auricomus L. coll. (s. str.), *Flora Fennica*, **3**, 1-128. The author has studied the apomictic *Ranunculus auricomus* complex in Finland for over 20 years, and now describes 94 new subspecies (ap.) from the country. Detailed localities are given and photographs of the new subspecies are provided.—[D.H.K.]

46/19. RANUNCULUS FLUITANS Lam. Kjellquist, E. & Strandhede. s.o., 1961, Nytt fynd av Ranunculus fluitans Lam., *Bot. Not.*, **114**, 367-368. *Ranunculus fluitans*, previously known in Sweden only from the Vramså river system, has been found in the Mjöa river, East Scania.

Cytological investigation has revealed that the plant has $2n=14$.—[D.H.K.]

46/24. RANUNCULUS FICARIA L. Sandwith, C. I. & N. Y., 1961. Bristol botany in 1960, *Proc. Bristol Nat. Soc.*, **30**, 107-112. Includes some notes on *Ranunculus ficaria* in the Bristol area. *R. ficaria* var. **bulbifer** Albert (as "*bulbifera*"), *Cat. Pl. Vasc. Dept. du Var*, p. 7 (1908), predates var. *bulbifer* Marsden-Jones by many years.

Clapham, in Clapham, Tutin & Warburg, *Flora of the British Isles*, 101 (1952), identifies var. *bulbifer* with the name var. *ficaria*, but the identification of the Linnean type is evidently a subject for further investigation.—[D.H.K.]

46/24. RANUNCULUS FICARIA L. Walker, S. & Heywood, V. H., 1961, Morphological separation of cytological races in Ranunculus ficaria L., *Nature*, **199**, 604. Previous studies by other workers on British material of *Ranunculus ficaria* have shown that the var. *bulbifer* is a tetraploid with $2n=32$, while var. *fertilis* is a diploid with $2n=16$. Marsden-Jones gave a number of morphological characters, apart from the presence or absence of axillary bulbils, for separating the two races; these included number and relative width of petals and range in stamen and carpel number.

Field and laboratory studies on populations of *R. ficaria* in North Wales and Cheshire have shown that petal, stamen and carpel characters are unsatisfactory for the taxonomic separation of the two races. It is pointed out also that, although the presence or absence of bulbils has always been considered a distinguishing character between the two races, it is not generally realised that bulbils are formed only towards the end of the flowering season. This has caused some confusion, as presence of bulbils is a positive character, while absence may imply true absence or simply immature material which may later develop bulbils.

It is not generally certain that the association of bulbils with the tetraploid is always constant, although it would generally appear to hold good.—[D.H.K.]

53. BERBERIS. Ahrendt, L. W. A., 1961, Berberis and Mahonia. A taxonomic revision, *J. Linn. Soc., Bot.*, **57**, 1-410. "*Mahonia aquifolium*" is frequently grown in Britain and occurs as an established escape. Populations vary considerably with leaf surfaces from very lustrous to quite dull, leaflets vary considerably in breadth, and range from coarsely to finely toothed.

British plants grown from garden seed consist largely of hybrids, probably mainly between *M. aquifolium* and *M. repens* G. Don. Also in cultivation is *M. pinnata* (Lag.) Fedde from California. The distinctions between *M. pinnata* and "*M. aquifolium*" are at first sight obscured in cultivation owing to the hybrid variation already mentioned, but *M. pinnata* differs from true *M. aquifolium* in having dull, finely serrate leaves and petals shorter than the inner sepals.—[D.H.K.]

54. MAHONIA—See 53. BERBERIS.

55→NYMPHAEACEAE. Cutter, E. G., 1961, The inception and distribution of flowers in the Nymphaeaceae, *Proc. Linn. Soc.*, **172**, 93-100.

57/2. CERATOPHYLLUM SUBMERSUM L. Clason, E. W., 1961, Ceratophyllum submersum L. in Nederland, *Gorteria*, **1**, 9-12. Before 1954 *Ceratophyllum submersum* was represented in Netherlands herbaria mainly from a few localities near the coast, and was regarded as a very rare plant. Investigation since 1954 has revealed that the species still grows in several localities near the coast, and is fairly common in some parts of the province of Zeeland. The plant grows in oligohaline to mesohaline waters but not in salt ones. The only known inland occurrence is in South Limberg.

A map illustrates the localities known before and after 1954.

Descriptions of *C. submersum* and *C. demersum* are given, and the fruits of the two species are illustrated by line drawings.—[D.H.K.]

64→ Fumariaceae. Ryberg, M., 1960, A morphological study of the Fumariaceae and the taxonomic significance of the characters examined, *Acta Hort. Berg.*, **19** (4), 121-248.

64. Dicentra. Stern, K. R., 1961, Revision of Dicentra (Fumariaceae), *Brittonia*, **13**, 1-57.

65. Corydalis. Ryberg, M., 1959, A morphological study of Corydalis nobilis, C. cava, C. solida, and some allied species, with special reference to their underground organs, *Acta Hort. Berg.*, **19** (3), 15-119.

79. Lepidium. Mulligan, G. A., 1961, The genus Lepidium in Canada, *Madroño*, **16**, 77-90. Describes the species of *Lepidium* found in Canada and gives a key to their identification. A key is provided also to the varieties of *L. densiflorum*.—[D.H.K.]

95/1. Erophila verna (L.) Chevall. Harrison, J. W. Heslop- 1961, The distribution of the vernal whitlow-grass (Erophila verna) in Northumberland and Durham, *Vasc.*, **46**, 12-13. The author's request for information about the range of *Erophila verna* in the lowlands of Northumberland and Durham has brought in very little new data. One factor is that, except for Holy Island, no coastal localities have been reported. This is rendered the more noteworthy by the total absence of the species from the lowland areas of the two counties.—[D.H.K.]

100/6. Arabis stricta Huds. Pring, M. E., 1961, Arabis stricta Huds. (Biological Flora). *J. Ecol.*, **49**, 431-437.

108. Sisymbrium. Ball, P. W., 1961, The identity of Sisymbrium pyrenaicum L. ex Loefl. and later homonyms, *Fedde. Rep.*, **64**, 14-17.

108/3. Sisymbrium loeselii L. Dupontrué, G., 1959, Une adventice nouvelle pour la Picardie: Sisymbrium loeselii L., *Bull. Trim. Fed. Franc. Soc. Sci. Nat.*, **20**, 101-102. Discovered near the railway at Amiens, *Sisymbrium loeselii* is considered as a new alien for the Somme, and probably for the north of France.—[E.B.B.]

111/N. Neslia paniculata (L.) Desv. Ball, P. W., 1961, The taxonomic status of Neslia paniculata (L.) Desv. and N. apiculata Fisch., Mey. & Avé-Lall., *Fedde. Rep.*, **64**, 11-13. *Neslia paniculata* is distributed over much of Europe, and it is only fairly recently that it has become generally recognised that it is composed of two taxa, viz.:—*N. paniculata* subsp. *paniculata* and *N. paniculata* subsp. *thracica* (Velen.) Bornm. (*N. apiculata* Fisch., Mey. & Avé-Lall.). The former is widespread in Europe except in the south and frequently occurs as a casual outside its native range. The latter is found mostly in southern Europe, to the exclusion of subsp. *paniculata*, and rarely occurs elsewhere as an adventive.—[D.H.K.]

112/3. Reseda alba L. Anonymous, 1961, Reseda alba in Co.

Dublin, *Irish Nat. J.*, **13**, 215.

113. VIOLA. Moore, D. M. & Harvey, M. J., 1961, Cytogenetic relationships of Viola lactea Sm. and other west European violets, *New Phyt.*, **60**, 85-95.

113. VIOLA. Schmidt, A., 1961, Zytotaxonomische Untersuchungen an europäischen Viola-Arten der Sektion Nominium, *Österr. Bot. Zeitschr.*, **108**, 20-88.

113/3. VIOLA RUPESTRIS Schmidt. Valentine, D. H. & Harvey, M. J. 1961, Variation in Viola rupestris Schmidt, *Veröff. Geobot. Inst. Eidg. Techn. Hochschule Stift. Rubel in Zurich*, **36**, 157-163. An account of variation in Czech and British populations of *Viola rupestris*. The former being studied during, and from material collected at, the 12th International Phytogeographical excursion in 1958.—[D.H.K.]

113/4. VIOLA RIVINIANA Reichb. Dizerbo, A. H., 1960, Viola riviniana ssp. minor (Murbeck) Valentine (V. riviniana β ericetorum Corbière), sa valeur taxonomique, sa répartition dans le Massif Armoricain, *Bull. Soc. Sci. Bretagne*, **35**, 97-111. The taxonomic history and distribution in Great Britain and Brittany of *Viola riviniana* subsp. *minor* are discussed. Detailed experimental work is described and statistical results recorded. Comparison shows that French forms are smaller than British, upholding Valentine's view that a geographical gradient exists. Corbière's varietal name *ericetorum* must be superceded by subsp. *minor* (Murb.) Valentine on elevation to sub-specific rank.—[E.B.B.]

113/12. VIOLA TRICOLOR L. Pettet, A., 1960, Some problems in Viola tricolor L. and its allies, in Harper, J. L. *The Biology of Weeds*, 55-60.

115/5. HYPERICUM PERFORATUM L.—See 319/16. EUPHORBIA CYPARISSIAS.

115/6 × 5. HYPERICUM × DESETANGSII Lamotte. Sledge, W. A., 1961, Hypericum desetangsii Lamotte in Yorkshire, *The Nat*,. **1961**, 43-44.

118. HELIANTHEMUM. Proctor, M. C. F. & Lambert, C. A., 1961, Pollen spectra from recent Helianthemum communities, *New Phyt.*, **60**, 21-26.

131/7. CERASTIUM HOLOSTEOIDES Fr. Ooststroom, S. J. van and Reichgelt, T. J., 1961, De ondersoorten van Cerastium holosteoides Fr. in Nederland, *Gorteria*, **1**, 13-15. Three subspecies of *Cerastium holosteoides* Fr. occur in the Netherlands. Subsp. *triviale* (Murb.) Möschl is common throughout the country, subsp. *holosteoides* and subsp. *pseudoholosteoides* Möschl are very rare and only found in a few localities in the tidal area of the larger rivers (island of Dordrecht; Biesbosch).

The three subspecies may be distinguished as follows:—

1. Leaves hairy above. Indumentum of the plant consisting of long, very acute hairs, whether or not mixed with glandular ones .... Subsp. *triviale*
1. Leaves glabrous above, at most ciliate at the margin.
  2. Indumentum of the plant consisting of very acute hairs, which are, however, shorter than in subsp. *triviale;* glandular hairs present or lacking .... Subsp. *holosteoides*
  2. Indumentum of the plant exclusively consisting of short, obtuse hairs: glandular hairs always lacking .... Subsp. *pseudoholosteoides*

—[Author's summary].

141/3. Arenaria ciliata L. Favarger, C., 1960, Recherches cytotaxonomiques sur les populations alpines d'Arenaria ciliata L. (sens. lat.), *Ber. Schweiz. Bot. Ges.*, **70**, 126-140. A cytological study of alpine populations of *Arenaria ciliata* shows that subsp. *moehringioides* of the west, north and south is tetraploid ($n=20$) whilst subsp. *tenella* of the east and central alps is octoploid ($n=40$) and dodecaploid ($n=60$) in different parts of its range.

Plants discovered with $n=120$, distinguished morphologically by a certain gigantism, are provisionally referred to subsp. *bernensis* (nomen nudum).

This provides an example of "chromosome races" corroborating taxonomic distinction based on morphology, ecology and distribution.—[E.B.B.]

141/4. Arenaria norvegica Gunn. Harrison, J. Heslop-, Wilkins, D. A. & Green, S. W., 1961, Arenaria norvegica Gunn., a species new to the Irish flora in Co. Clare, *Irish Nat. J.*, **13**, 267-268. A colony of *Arenaria norvegica* has been found growing in shallow crevices and solution hollows on an area of limestone pavement on the south slope of Gleninagh Mountain, overlooking Caher Lower, N. Clare.

The plants to some respect resemble those found in Yorkshire, and cannot be associated with *A. ciliata* subsp. *hibernica* found in Co. Sligo. The species is new to Ireland.—[D.H.K.]

142/1. Spergula arvensis L. New, J. K., 1961, Spergula arvensis L. (Biological Flora), *J. Ecol.*, **49**, 208-215.

153/A. Alternanthera. Ooststroom, S. J. Van & Reichgelt, T. J., 1961, Het geslacht Alternanthera Forsk. in Nederland, *Gorteria*, **1**, 2-6. Three species of *Alternanthera*, viz. *A. sessilis* (L.) R.Br. ex DC., *A. pungens* Kunth and *A. peploides* (Humb. & Bonpl. ex Willd.) Urban, have been found as aliens in the Netherlands. A key is provided to their identification.—[D.H.K.]

160. Salicornia. Soó, R., 1960, Über südosteuropäische Salicornien, *Acta Bot. Hung.*, **6**, 397-403.

162. Tilia. Hadfield, M., 1961, Notes on lime trees in Britain, *Quart. J. For.*, **55**, 303-312.

162/2. Tilia cordata Mill. Sen, D. N., 1961, Self-saprophytism in roots of Tilia cordata, *Preslia*, **33**, 36-40.

170/8. Oxalis latifolia Kunth. Jackson, D. I., 1960, A growth study of Oxalis latifolia H. B. K., *New Zeal. J. Sci.*, **3**, 600-610.

187/1. Ulex europaeus L. Franck, J. Gehu-, 1961, Données nouvelles sur l'écologie d'Ulex europaeus L.: relations avec le substratum dans une lande semi-naturelle, *Bull. Soc. Bot. Nord France*, **14**, 23-33. An ecological study of *Ulex europaeus* with special reference to the pedology of both the rich basic and poor acid heathlands on which it occurs.—[E.B.B.]

190/3. Medicago lupulina L. Jalas, J., 1960, Distribution and history of different hairiness types of Medicago lupulina L. in eastern Fennoscandia, *Fedde. Rep.*, **63**, 215-218.

192. Trifolium. Hossain, M., 1961, A revision of Trifolium in the nearer East, *Notes Roy. Bot. Gard. Edinb.*, **23**, 387-481.

192/13. TRIFOLIUM SUBTERRANEUM L. Symon, D. E., 1961, A Bibliography of Subterranean Clover together with a descriptive introduction. *Commonwealth Bureau of Pastures and Field Crops, Hurley, Berks., Mimeographed Publ. No.* **1/1961**. Pp. 122.

192/18. TRIFOLIUM REPENS L. Thomas, R. G., 1961, Flower initiation in Trifolium repens L.: a short-long day plant, *Nature*, **190**, 1130-1131.

195. LOTUS. Zertova, A., 1961, Studie über die tschechoslowakischen Arten der Gattung Lotus L., 1, *Preslia*, **33**, 17-35.

195/1. LOTUS CORNICULATUS L. Ujhelyi, J., 1960, Etudes taxonomiques sur le groupe du Lotus corniculatus L. sensu lato, *Ann. Hist. Nat. Mus. Nat. Hung.*, **52**, 185-200. A wrong assessment of the taxonomic value of certain characters, e.g. pilosity, has led to confusion in the previous treatment of the *Lotus corniculatus* complex in Hungary. Cytological and morphological study of living material and of herbarium specimens in the National Museum of Hungary have led to the recognition of the following seven species:—*L. tenuis* Waldst. & Kit. ex Willd., *L. corniculatus* L. sensu stricto, *L. borbasii* Ujhelyi, sp. nov., *L. degenii* Ujhelyi, sp. nov., *L. delorti* Timb.-Lagr. apud Jord., *L. rostellatus* Heldr. and *L. orphanidis* Ujhelyi, sp. nov.—[E.B.B.]

206. VICIA. Rousi, A., 1961, Cytotaxonomic studies on Vicia cracca L. and V. tenuifolia Roth, 1. Chromosome numbers and karyotype evolution, *Hereditas*, **47**, 81-110.

211. RUBUS. Dowrick, G. J., 1961, Biology of reproduction in Rubus, *Nature*, **191**, 680-682.

211. RUBUS. Haskell, G., 1961, Genetics and the distribution of British Rubi, *Genetica*, **32**, 118-132. The changes in proportion across Europe of the various sections of apomictic polyploid species of the subgenus *Rubus* are described. The north-western countries have a higher frequency of simple forms of blackberries, whereas south-eastern areas such as the Caucasus and Hungary have a higher proportion of complex types.

The distributions of the 344 "species" of true blackberries (subgen. *Rubus*) in Great Britain are analysed collectively for the five sections from Watson's data (*Handbook of the Rubi of Great Britain and Ireland*, 1958). The centre of diversity is south-east England; this may be related to the proximity with the Continent, or to greater numbers of botanists in this area. The general pattern of distribution appears to reflect the limits of glaciation, with the diversity of species north of the original limits of glaciation falling off very rapidly. The relation between the taxonomy and scarcity indicates that the sections with the simpler types are less restricted in their distribution than the sections of complex forms. The relative abundance of *Rubus* species in Great Britain is analysed, and the number of species plotted against the vice-comital frequency shows a log-series. The number of species per vice-county grouped in geometric x3 classes shows a close fit with the theoretical Poisson distribution.

The basis for the variation in these apomictic polyploid Rubi is considered in relation to the cytological origin of the apomictic mechanism. —[Author's summary].

211. Rubus. Thompson. M. M., 1961, Cytogenetics of Rubus, 2 Cytogenetic studies of the varieties 'Young', 'Boysen', and related forms, *Amer. J. Bot.*, **48**, 667-673.

211/6. Rubus idaeus L. Hudson, J. P. & Williams, I. H., 1961, Effects of environment and age on flowering in raspberries, *Proc. Linn. Soc.*, **172**, 101-108.

212. Potentilla. Gagnieu, A., Bouteiller, J. & Linder, R., 1961, Les potentilles dans la flore d'Alsace, *Bull. Soc. Bot. France*, **106** (85th sess. extr.), 148-154. The 16 species of *Potentilla* found in Alsace are listed, with notes on their ecology and caryology.—[E.B.B.]

216/3. Geum rivale L. Löve, A. & D., 1961, Some nomenclatural changes in the European flora, 2. Subspecific categories, *Bot. Not.*, **114**, 48-56. The populations of *Geum rivale* found in Iceland, the Faroes, the Hebrides and some parts of the Scottish mountains differ from the usual form in having leaves which are more unevenly, more roughly and deeply incised. The petals are first greenish-white and later become reddish.

The plant concerned is described as **G. rivale** subsp. **islandicum** Löve & Löve, subsp. nov.—[D.H.K.]

217. Dryas. Hultén, E., 1959, Studies in the genus Dryas, *Svensk Bot. Tidskr.*, **53**, 507-542.

220. Alchemilla. Walters, S. M., 1960, Suggested treatment for Alchemilla in 'Flora Europaea', *Fedde. Rep.*, **63**, 127-131.

225. Rosa. Rowley, G., 1960, Aneuploidy in the genus Rosa, *J. Gen.*, **57**, 253-268.

227. Cotoneaster. Browicz, K., 1959, Gatunki z rodzaju Cotoneaster Ehrh. w Polsce, *Arbor.--Kornickie*, **4**, 4-108. Studies on the geographical distribution of the Polish species of *Cotoneaster*, viz. *C. melanocarpus* Lodd., *C. integerrimus* Med. and *C. tomentosus* Lindl.—[D.H.K.]

232. Sorbus. Kovanda, M., 1961, Flower and fruit morphology of Sorbus in correlation to the taxonomy of the genus, *Preslia*, **33**, 1-16. Studies on the Czech species of *Sorbus*, with a key to their identification.—[D.H.K.]

235/2. Sedum telephium L. Webb, D. A., 1961, What is the type of Sedum telephium L.?, *Fedde. Rep.*, **64**, 18-19. The type of *Sedum telephium* is shown to be the white-flowered variety (*S. telephium* subsp. *purpureum* var. *album* (L.) Schinz & Thell.), this must be renamed subsp. **telephium**, consequently, if one wishes to distinguish the purple-flowered variety, it must be as **S. telephium** var. **purpurascens** (Koch) D. A. Webb, stat. nov. (*S. purpurascens* Koch).—[D.H.K.]

239/3. Saxifraga hirculus L. Albertson, N. & Larsen, B.M.P., 1960, Bidrag till kännedon om Saxifraga hirculus—myren Sjöängen, växtsamhallen, *Bot. Not.*, **113**, 353-372. Notes on the plant communities found in the *Saxifraga hirculus* mire at Sjöängen, Västergötland, southern Sweden.—[D.H.K.]

249. Lythrum. Agnew, A.D.Q., 1961, The family Lythraceae in Iraq, *Bull. Iraq Nat. Hist. Mus.*, **1** (1), 1-10. Most specimens of *Lythrum salicaria* in Iraq come under var. *tomentosum* (Mill.) DC. but individuals indistinguishable from the European plant do occur.

L. hyssopifolium is widely distributed but is often confused with *L. silenoides* Boiss. In the lowlands of Iraq it is usually found in sub-saline temporary ponds and rarely on the banks of rivers.—[D.H.K.]

251. DAPHNE. Martin, I. H., 1961, The genus Daphne, *Rep. Third Intern. Rock Gard. Plant Conf.*, 125-130. An account of some of the more hardy species of *Daphne* in cultivation.—[D.H.K.]

254. EPILOBIUM. Melville, R., 1960, Epilobium pedunculare A. Cunn., and its allies, *Kew Bull.*, **14**, 296-300. Three species have been confused under the name *Epilobium pedunculare*, viz. *E. inornatum* Melville, sp. nov., *E. nerterioides* Cunn. and *E. pedunculare* Cunn. The differences between the three species are given.

E. linnaeoides Hook. f. is conspecific with **E. pedunculare** Cunn., and the latter name is the correct one for the plant concerned.—[D.H.K.]

255/1. CHAMAENERION ANGUSTIFOLIUM (L.) Scop. Thompson, J., 1961, Fasciated plants of the Rosebay Willow Herb, *Vasc.*, **46**, 6-7.

259/2. MYRIOPHYLLUM SPICATUM L. Löve. A., 1961, Some notes on Myriophyllum spicatum. *Rhodora*, **63**, 139-145.

261. HIPPURIS. McCully, M. E. & Dale, A. M., 1961, Heterophylly in Hippuris, a problem in identification, *Canad. J. Bot.*, **39**, 1099-1116.

309/1. PEUCEDANUM OSTRUTHIUM (L.) Koch. Julin, E., 1961, En förekomst av Peucedanum ostruthium (L.) Koch: Norrbotten. *Bot. Not.*, **114**, 322-328.

310. PASTINACA. Vollrath, H., 1960, Über behaarte Pastinak-Sippen in Bayern, *Ber. Bayer Bot. Ges.*, **33**, 108.

316/1. ASARUM EUROPAEUM L. Malecka, J., 1960, Cytologia Asarum europaeum L., *Acta Biol. Cracov.*, **2**, 113-121.

319/16. EUPHORBIA CYPARISSIAS L. Pritchard, T., 1960, Race formation in weedy species, with special reference to Euphorbia cyparissias L. and Hypericum perforatum L., in Harper J. L., *The Biology of Weeds*, 61-66.

320. POLYGONUM. Doida, Y., 1960, Cytological studies in the genus Polygonum, 1. Chromosome numbers in the genus Polygonum and related genera, *Ann. Rep. Nat. Inst. Genetics Japan*, **10**, 82-83.

320. POLYGONUM. Doida, Y., 1960, Developmental studies in the genus Polygonum, 3, *Ann. Rep. Nat. Inst. Genetics Japan*, **10**, 83-85.

320. POLYGONUM. Styles, B. T., 1960, The taxonomy of the British Knotgrasses, in Harper, J. L., *The Biology of Weeds*, 48-54. Three species of Knotgrass are recognised in Britain by the author, viz. *Polygonum aviculare* L. sensu stricto (*P. heterophyllum* Lindm.), $2n=60$, **P. arenastrum** Bor. (*P. aequale* Lindm.), $2n=40$ and *P. rurivagum* Jord., $2n=60$.

P. aviculare is very common throughout Britain in cornfields and waste places, on arable land and the seashore. *P. arenastrum* is also very common and is found most frequently on paths, tracks, and in waste places and cracks between paving stones. *P. rurivagum* is found among cereal crops in fields with a chalky soil, and its British distribution is as yet not worked out.

The maritime plant referred to *P. littorale* Link by British botanists does not differ significantly from inland populations of *P. aviculare* or *P. arenastrum*.

P. calcatum Lindm. is of dubious occurrence in Britain, all the material examined being referable to *P. arenastrum*.—[D.H.K.]

320/21. POLYGONUM POLYSTACHYUM Wall. ex Meisn. Damade, H., 1959, Une plante nouvelle dans la Somme: Polygonum polystachium Wallich, *Bull. Trim. Fed. Franc. Soc. Sci. Nat.*, **20**, 102-103. Introduced into France about 1900, this species is recorded for the first time for the Somme.—[E.B.B.]

330. ULMUS. Richens, R. H., 1961, Studies on Ulmus, 4. The village elms of Huntingdonshire and a new method for exploring taxonomic discontinuity, *Forestry*, **34**, 47-64. Further to studies of the elm floras of Cambridgeshire and Hertfordshire (*Forestry*, **31**, 132 & **32**, 138), a biometrical study was made of the leaves of the village elms of Huntingdonshire, utilizing 102 samples. Most of the samples could be placed in three closely related, and one more remote group, of *U. carpinifolia*. Sporadic samples of *U. procera* and putative hybrids of *U. carpinifolia* × *glabra* and *U. carpinifolia* × *procera* were also found.

It is thought that the most frequently occurring type of *U. carpinifolia* is of Roman introduction, Godmanchester being a likely centre of distribution. Most of the *U. procera* appears to date back no farther than the eighteenth century.

Some notes on the horticultural variety known as the Huntingdon Elm are included.—[Author's summary].

334/1. PLATANUS × HYBRIDA Brot. Hadfield, M., 1960, The mystery of the London Plane, *Gard. Chron.*, **148**, 422-423, 443 & 463.

339. FAGUS. Kolakovsky, A. A., 1960, On the history of beech in Eurasia, *Trans. Moscow Soc. Nat.*, Biol. Ser., **3**, 141-156 [in Russian].

341. QUERCUS. Zohary, M., 1961, On the oak species of the Middle East, *Bull. Research Council Israel*, **9D**, *Sect. D. Botany*, 161-186.

342. POPULUS. Régnier, R., 1960, Les peupliers en Normandie, *Rev. Soc. Sav. Haute Normandie*, **17**, 25-42. The native, introduced and hybrid poplars of Normandy are described and their afforestation discussed. A key to the species and many varieties and cultivars is given.—[E.B.B.]

343. SALIX. Brown, M. Jefferson-, 1960, Dwarf willows, *Gard, Chron.*, **148**, 213.

343. SALIX. Skvortsov, A. K., 1960, Salix pentandra L. and its allies: A taxonomical and geographical review, *Trans. Moscow Soc. Nat.*, Biol. Ser., **3**, 247-262 [in Russian].

343/12. SALIX CINEREA L. Rechinger, K. H. & Lawalrée, A., 1960, Deux Salix méconnus de Belgique: S. atrocinerea Brot. et S. × guinieri Chassagne et Görz, *Bull. Jard. Bot. Brux.*, 30, 467-472. A detailed description of *Salix atrocinerea* is given, together with its distribution and the vegetative characters by which it may be differentiated from *S. cinerea*.

The hybrid *S. atrocinera* × *caprea* (*S.* × *guinieri*), is intermediate in character, especially in the pilosity of branches, buds and leaves. It is said to occur around Cambridge and in France, and may be new to Belgium.—[E.B.B.]

357/4. ERICA CINEREA L. Wood, P. W., 1960, White-flowered forms of Erica cinerea, *Irish Nat. J.*, **13**, 187-188.

359/1. Pyrola minor L. Berrier, L., 1960, Disparition et réapparition d'une station de Pirola minor, *Cahier des Nat.*, **16**, 81. *Pyrola minor* was found in 1949 in the forest of La Londe (Seine-Maritime) but could not be refound for the next ten years. It reappeared in 1960.—[E.B.B.]

359/3. Pyrola rotundifolia L. Hansen, A. & Pedersen, A., 1961, Noter om dansk flora og vegetation, 19. Pyrola rotundifolia L. ssp. arenaria (Koch) n. comb., Klit-Sommerkonval, *Flora og Fauna*, **67**, 136-138. *Pyrola rotundifolia* var. *arenaria* Koch is identical with *P. rotundifolia* subsp. *maritima* (Kenyon) E. F. Warb., and is elevated to *P. rotundifolia* subsp. *arenaria* (Koch) Hansen & Pedersen, comb. nov. replacing subsp. *maritima*.*

The distribution of *P. rotundifolia* subsp. *rotundifolia* and subsp. *arenaria* in Denmark is discussed, and the range of the latter in Denmark and in Europe is shown by a map.—[D.H.K.]

364. Empetrum. Vassiliev, V. N., 1961, *Empetrum*. Pp. 131. Moscow. 1961. (in Russian). A monograph of the genus *Empetrum*.—[D.H.K.]

364/1. Empetrum nigrum L. Dalby, E., 1961, The ecology of Crowberry (Empetrum nigrum) on Ilkley Moor, 1959-60, *The Nat.*, **1961**, 37-40.

367. Primula. Woodell, S. R. J., 1960, Studies in British Primulas, 7. Development of normal seed and of hybrid seed from reciprocal crosses between P. vulgaris Huds. and P. veris L., *New Phyt.*, **59**, 302-313. 8. Development of seed from reciprocal crosses between P. vulgaris Huds. and P. elatior (L.) Hill and between P. veris L. and P. elatior (L.) Hill, *loc. cit.*, **59**, 314-325,

367. Primula. Woodell, S. R. J., 1960, What pollinates Primulas? *New Scient.*, **8**, 568-571. British Primulas are visited by many insects, but it is not known to which insect or insects their pollination is mainly due. It is possible that the fertilizing agents are either small beetles inhabiting the flowers, or nocturnal visitors, or both.—[D.H.K.]

380→ Gentianaceae. Favarger, C., 1960, Etude cytologique du Cicendia filiformis et du Microcala pusilla (Gentianacées), *Bull. Soc. Bot. France*, **107**, 94-98. *Cicendia filiformis* and *Microcala pusilla* differ not only morphologically but in basic chromosome number; in *C. filiformis* $n=13$, in *M. pusilla* $n=10$. The latter number is observed for the first time in *Gentianaceae*. It is suggested that the two species represent relicts of a tertiary hygrophilic flora with tropical affinities.—[E.B.B.]

389→ Boraginaceae. Ingram, J., 1961, Studies in the cultivated Boraginaceae, 4. A key to the genera, *Baileya*, **9**, 1-12 & 56. A comprehensive key is provided to identification of the genera of *Boraginaceae* in cultivation.—[D.H.K.]

390. Omphalodes. Ingram, J., 1960, Studies in the cultivated Boraginaceae, 3. Omphalodes, *Baileya*, **8**, 137-141. The species of *Omphalodes* in cultivation are described and a key provided to their identification.—[D.H.K.]

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*This is contrary to the *International Code of Botanical Nomenclature*.—Ed.

392. SYMPHYTUM. Ingram, J., 1961, Studies in the cultivated Boraginaceae. 5. Symphytum, *Baileya*, **9**, 92-99. Describes and illustrates the species of *Symphytum* known to be in cultivation. The following key is provided to their identification.

KEY TO THE CULTIVATED SPECIES OF SYMPHYTUM

1. Stems essentially unbranched; roots tuberous; sterile shoots decumbent .... *S. grandiflorum*

1. Stems much-branched; roots thick or spindle-shaped or with spindle-shaped divisions.

2. Calyx not lobed below the middle.

3. Corollas white .... *S. orientale*

3. Corollas blue .... *S. caucasicum*

2. Calyx lobed below the middle and usually almost to the base.

4. Corollas white, cream-coloured or yellow.

5. Cauline leaves strongly decurrent, ovate to oblong-ovate, cordate to rounded at the base .... *S. tauricum*

5. Cauline leaves strongly decurrent, often forming a wing down the stem to the next lower node, oblong-lanceolate to oblong-ovate .... *S. officinale*

4. Corollas rose-purple, or rose-pink changing to blue or purple.

6. Cauline leaves strongly decurrent, forming a wing down the stem; flowers dull purple or rose; calyx not enlarging in fruit; anthers shorter than the filaments .... *S. officinale*

6. Cauline leaves not or only very shortly decurrent on the stem; calyx mostly enlarging in fruit; anthers longer than the filaments or almost equal to them in length.

7. Expanded flowers purple; calyx-lobes linear-lanceolate, acuminate; anthers and filaments about equal in length .... *S.* × *uplandicum*

7. Expanded flowers blue; calyx lobes triangular, obtuse; anthers longer than the filaments .... *S. asperum*

—[D.H.K.]

404. DICHONDRA. Tharp, B. C. & Johnston, M. C., 1961, Recharacterization of Dichondra (Convolvulaceae) and a revision of the North American species, *Brittonia*, **13**, 346-360.

413. SOLANUM. Wessely, I., 1960, Die mitteleuropäischen Sippen der Gattung Solanum Sektion Morella, *Fedde. Rep.*, **63**, 290-321. Gives a key to the mid-European species of *Solanum* section *Morella* and their varieties and forms, with synonymy and citation of exsiccata seen.—[D.H.K.]

415/1. DATURA STRAMONIUM L. Danielsen, A. & Ouren, T., 1961, Om spredningen av piggeple (Datura stramonium L.) i Norge, *Blyttia*, **1961**, 69-108. *Datura stramonium* appears as an adventive in Norway and is able to ripen its seeds under favourable conditions. There was a marked tendency to mass-occurrence during the warm summers of 1953, 1955, and, especially 1959. The seeds apparently lay dormant under the soil until a favourable summer provided the conditions for germination.

The first record for Norway dates from between 1675 and 1692, and until 1947 the plant occurred as a sporadic introduction, possibly also as a garden escape.

In 1947 it was observed in a number of localities, and since that time has become increasingly plentiful.

Datura seeds have been noted as impurities in Soya Beans, wheat, barley, sorghum and maize imported from the U.S.A., and the increased use of N. American feeding stuff very probably explains the increase of the plant in Norway.

Adventives frequently found accompanying *Datura* after World War 2 include *Amaranthus retroflexus*, *Ambrosia artemisiifolia* and *Abutilon theophrasti*.

A complete list of all known Norwegian records is given.—[D.H.K.]

415/N. NICOTIANA. Goodspeed, T. H. & Thompson, M. C., 1959, Cytotaxonomy of Nicotiana, 2, *Bot. Rev.*, **25**, 385-415.

425. MIMULUS. Mukherjee, B. B. & Vickery, R. K., Junr., 1961, Chromosome counts in the genus Mimulus (Scrophulariaceae), *Madroño*, **16**, 104-105.

430/24. VERONICA FILIFORMIS Sm. Jehlik, V., 1961, Rozsireni Veronica filiformis Sm. v Československu a poznámky k jejima výskytu, *Preslia* **33**, 315-321. The introduction of *Veronica filiformis* into Czechoslovakia and its consequent spread to wild habitats is discussed and illustrated by a map.—[D.H.K.]

440. OROBANCHE. Sunderland, N., 1960, Germination in the seeds of angiospermous root parasites, in Harper, J. L., *The Biology of Weeds*, 83-93.

445/4 × 6. MENTHA × DUMETORUM Schult. Jansen, M.T., 1961, Mentha × dumetorum Schult. aan de Voerenbeck, *Gorteria*, **1**, 2.

448. THYMUS. Machele, M., 1960, Die mitteleuropäishen Thymus-Arten Formen und Bastarde, *Mitt. Thur. Bot. Ges.*, **2**, 176-207.

448. THYMUS. May, G., 1960, Contribution a l'étude morphologique de quelques Thymus du Maroc, *Trav. l'Inst. Scient. Chérif. Sér. Bot.*, **20**, 10-71.

462/1. LAMIUM AMPLEXICAULE L. Pickens, A. L. & M. C. W., 1960, Variations in Quercus, Silene and Lamium, *Castanea*, **25**, 125. A white-flowered form of *Lamium amplexicaule* is described as var. *album*, nov. var. The stem is also markedly lighter in colour than in the usual pink-flowered plant.—[D.H.K.]

471/1. AJUGA CHAMAEPITYS (L.) Schreb. Smejkal, M., 1961, Taxonomická studie drhu Ajuga chamaepitys (L.) Schreb. ampl. Briq. v Československu, *Preslia*, **33**, 386-398. Two subspecies of *Ajuga chamaepitys* are found in Czechoslovakia— subsp. *chamaepitys*, locally plentiful in a number of localities, and subsp. *ciliata* (Briq.) Smejkal, comb. nov., which is much more restricted in occurrence. *A. chamaepitys* subsp. *chamaepitys* is found in mid- and western Europe and N. Africa, while subsp. *ciliata* is found in south-eastern and eastern Europe.—[D.H.K.]

472. PLANTAGO. Ka'bi, Z. Chalabi-, 1961, The genus Plantago in Iraq, *Bull. Iraq Nat. Hist. Mus.*, **1** (2), 1-41, Includes most of the species found in Britain and a key to the varieties of *Plantago lanceolata*.—[D.H.K.]

472. PLANTAGO. Sagar, G. R., & Harper, J. L., 1960, Factors affecting the germination and early establishment of plantains (Plantago lanceolata, P. media and P. major), in Harper, J. L., *The Biology of Weeds*, 236-245.

472/5. PLANTAGO CORONOPUS L. Gorenflot, R., 1961, Autotétraploidie et autooctoploidie expérimentales chez Plantago coronopus L., *Bull. Soc. Bot. France*, **108**, 100-114. A statistical study of colchicine induced polyploidy in *P. coronopus* shows that it results in smaller size of leaf but larger size of floral parts and seed, the bracts remaining unaffected. The size of stomatic cells increases with polyploidy.—[E.B.B.]

475/7. Campanula rotundifolia L. Hubac, J. M., 1961, Etude morphologique et cytologique d'une forme hexaploide du Campanula rotundifolia L., s.l. du Massif Central, *Bull. Soc. Bot. France*, **108**, 16-17. Known previously only from N. Africa, a hexaploid ($2n = 102$) form of *Campanula rotundifolia* has been found in the Massif Central. No particular gigantism is associated with the polyploidy, the origin of which is suggested as hybridisation of forms with $2n = 34$ and $2n = 68$ and doubling of chromosomes.—[E.B.B.]

485/2. Galium boreale L. Rahn, K., 1961, Cytological and taxonomical studies of Galium boreale and allied species (A preliminary note), *Bot. Tidsskr.*, **56**, 351-354. Cytological studies on *Galium boreale* from Europe have revealed $2n = 44$ and $2n = 66$, but it was not possible to distinguish any morphological differences between tetraploid and hexaploid plants.

Herbarium specimens having fruits with uncinate hairs are noted from Europe. In American material the hairs of the fruits are straight.

Specimens from Teesdale and Lough Derg had $2n = 44$.—[D.H.K.]

494/1. Valerianella locusta var. dunensis Allen. Scannell, M., 1961, Valerianella locusta var. dunensis Allen in Ireland, *Irish Nat. J.*, **13**, 275. Gives details of recent determinations made by D. E. Allen on Irish material of *Valerianella locusta* in the National Herbarium, Dublin.—[D.H.K.]

496. Centranthus. Pizzolongo, P., 1959, Ricerche sulla cariologica del genere Centranthus e loro importanza tassonomica, *Delpinoa*, new series, **1**, 149-164.

498/1. Knautia arvensis (L.) Coult. Jaeger, P., 1961, Contribution à l'étude du comportement des écotypes du Knautia arvensis (L.) Coult., *Bull. Soc. Bot. France*, **107**, 12-14. Two races or ecotypes of *Knautia arvensis* are observed in Alsace; one early flowering and fruiting, inhabiting meadows which are mown, and the other more widespread, late flowering and fruiting. Both, however, have a chromosome number of $2n = 40$.—[E.B.B.]

501. Rudbeckia. Dress, W. J., 1961, Notes on the cultivated Compositae, 6. The coneflowers: Dracopsis, Echinacea, Ratibida, and Rudbeckia, *Baileya*, **9**, 67-83. Includes descriptions of the species of *Rudbeckia* known to be in cultivation, together with a key to their identification.—[D.H.K.]

503. Galinsoga. Dahnke, W., 1960, Zur Einwanderung von Galinsoga parviflora Cav. und Galinsoga ciliata (Raf.) Blake in Mecklenburg, *Arch. d. Freunde d. Naturges. in Mecklenburg*, **5**.

503. Galinsoga. Hansen, A. & Pedersen, A., 1961, Noter om dansk flora og vegetation, 18. Vore to Galinsoga-arter, *Flora og Fauna*, **67**, 129-135. The history in Denmark of the two cosmopolitan *Galinsoga* species—*G. parviflora* and *G. ciliata* is outlined. *G. parviflora* was first noted in 1870, *G. ciliata* in 1927, yet between 1940 and 1959 *G. ciliata* apparently spread twice as quickly as *G. parviflora*. The

fruits of both plants are spread from nurseries, market gardens and greenhouses, with clods of earth sticking to gardening products. *G. ciliata* is most frequent on clay soils while *G. parviflora* is most common on sandy soils. The distribution of *G. parviflora* in Denmark in 1929, 1939, 1949 and 1959, and *G. ciliata* in 1939, 1949 and 1959 is illustrated by maps.—[D.H.K.]

506/8. SENECIO VULGARIS L. Cooper, G., 1961, Further observations on the recent spread of the rayed form of Senecio vulgaris in this area, *Ann. Rep. Warwick N.H.S.*, **7**, 18-19.

508/1. TUSSILAGO FARFARA L.—See 540/4. CIRSIUM ARVENSE (L.) Scop.

526. ANTHEMIS. Harling, G., 1960, Further embryological and taxonomical studies in Anthemis L. and some related genera, *Svensk Bot. Tidskr.*, **54**, 571-590.

534/1. COTULA CORONOPIFOLIA L. Webb, D. A., 1961, Cotula coronopifolia L. in Ireland, *Irish Nat. J.*, **13**, 262. *Cotula coronopifolia* has been discovered as an adventive in boggy, partly inundated ground in West Cork. It is new to Ireland.—[D.H.K.]

539. CARDUUS. Mulligan, G. A. & Moore, R. J., 1961, Natural selection among hybrids between Carduus acanthoides and C. nutans in Ontario, *Canad. J. Bot.*, **39**, 269-279.

540/4. CIRSIUM ARVENSE (L.) Scop. Bakker, D., 1960, A comparative life-history study of Cirsium arvense (L.) Scop. and Tussilago farfara L., the most troublesome weeds in the newly reclaimed polders of the former Zuiderzee, in Harper, J. L., *The Biology of Weeds*, 205-221.

543. SAUSSUREA. Lipschitz, S. J., 1960, Genus Saussurea and its representatives in the U.S.S.R., *Trans. Moscow Soc. Nat., Biol. Ser.*, **3**, 171-192 [in Russian].

544. CENTAUREA. Löve, A. & D., 1961, Some nomenclatural changes in the European flora, 1. Specific and supraspecific categories, *Bot. Not.*, **114**, 33-47. The authors recommend the splitting of the large and difficult genus *Centaurea* into a number of smaller genera. If their suggestion is adopted the following new names affecting plants found in Britain would come into use—**Acrolophus diffusus** (Lam.) Löve & Löve (*Centaurea diffusa* Lam.) **Acrocentron scabiosa** (L.) Löve & Löve (*Centaurea scabiosa* L.), **Leucantha solstitialis** (L.) Löve & Löve (*Centaurea solstitialis* L.) and **Jacea amara** (L.) Löve & Löve (*Centaurea amara* L.).—[D.H.K.]

549/1. HYPOCHOERIS RADICATA L. Wood, P. W., 1960, Pale-flowered variants of Hypochoeris radicata, *Irish Nat. J.*, **13**, 187. A colony of *Hypochoeris radicata* growing on the seashore at Murlough, near Newcastle, Co. Down, provided 13 pale-flowered variants. The colour of the flowers was a pale-straw or creamy primrose.—[D.H.K.]

552. TRAGOPOGON. Persell, J. V., 1959, Variations in the genus Tragopogon, *Proc. Indiana Acad. Sci.*, **69**, 262.

556. SONCHUS. Boulos, L., 1960, Cytotaxonomic studies in the genus Sonchus, 2. The genus Sonchus, a general systematic treatment, *Bot. Not.*, **113**, 400-420. The genus *Sonchus* comprises about 45 annual,

biennial and perennial species. Annual taprooted species are apparently more advanced than perennials. The vegetative parts are very variable in widely distributed advanced weeds and less variable among primitive and endemic species. Some species are polyploids.

The genus is subdivided into 3 subgenera: *Sonchus, Dendrosonchus* Webb ex Sch. Bip. and *Origosonchus* Boulos, subgen. nov. The first mentioned comprises the advanced species of different areas of distribution (endemics to cosmopolitan), while most *Dendrosonchus* species occur in the Canary Islands. *Origosonchus* contains the primitive species which are mainly in tropical and subtropical Africa. The genus *Sonchus* may have sprung from *Launaea* in central Africa, and then migrated to west tropical Africa and to the Canary Islands, then to north-west Africa.

A key to the species of the subgenus *Sonchus* is provided.—[Author's summary, p.p.]

556/2. Sonchus arvensis L. Boulos, L., 1961, Cytotaxonomic studies in the genus Sonchus, 3. On the cytotaxonomy and distribution of Sonchus arvensis, *Bot. Not.*, **114**, 57-64. All the glabrous, glandular-hairy, and the intermediate forms of Europe, as well as the introduced American perennial sowthistles with the same type of achenes (ratio of achene to pappus about 1:4), and possessing chromosome numbers from $2n = 36$ to $2n = 54$, may be conveniently grouped under *Sonchus arvensis* L.

S. uliginosus Bieb. is considered as a synonym of *S. arvensis* L.

Eastern Asiatic perennial sowthistles related to *S. arvensis* refer to *S. brachyotus* DC. (ratio of achene to pappus about 1:2). True *S. arvensis* does not occur in east Asia.—[Author's summary].

560. Taraxacum. Borgvall, T., 1960, The Taraxacum flora of Bohuslän, *Acta Hort. Got.*, **23**, 1-40. Descriptions are given, with ecological notes, of 166 species of *Taraxacum* found in Bohuslän, the northernmost province of the Swedish west coast—[D.H.K.]

560. Taraxacum. Malecka, J., 1958, Chromosome numbers of some Taraxacum species in Poland, *Acta Biol. Cracov.*, **1**, 55-56.

560. Taraxacum. Soest, J. L. Van, 1961, Les Taraxacum de Belgique, 2 (Section Vulgaria), *Bull. Jard. Bot. Brux.*, **31**, 319-389. Sixty-four species of *Taraxacum* section *Vulgaria* are recorded as occurring in Belgium; descriptions and distribution are given and forty-four are noted as occurring also in the British Isles.

Difficulties of determination are listed, e.g., incomplete material, insufficient documentation, abnormal situation, abnormal specimens, close affinities between species. The correct period for collecting specimens is given as between 15 April and 15 May.

Species of the section *Vulgaria* are found almost all over the world, but they are indigenous only in Europe, western Asia, mediterranean Africa, the Azores and the Canary Islands.—[E.B.B.]

562/1. Luronium natans (L.) Raf. Björkqvist, I., 1961, Luronium natans (L.) Raf. återfunnen i Skåne, *Bot. Not.*, **114**, 365-366. This rare Swedish species has been rediscovered in north-western Scania in a locality where it was last recorded in 1786.—[D.H.K.]

577. POTAMOGETON. Lægaard, S., 1960, Two species of Potamogeton new to Greenland, *Bot. Tidssk.*, **56**, 247-250. *Potamogeton perfoliatus* and *P. praelongus* have been discovered in Greenland.—[D.H.K.]

583/1. TOFIELDIA PUSILLA (Michx.) Pers. Kunze, H., 1960, Tofieldia pusilla (Michaux) Persoon subsp. nov. austriaca Kunze eine neue Sippe der Ostâlpenflora, *Phyton*, **9**, 135-139.

590/1. MAIANTHEMUM BIFOLIUM (L.) Schmidt. Kanai, H., 1961, Distribution and differentiation of Maianthemum bifolium in Japan, *J. Jap. Bot.*, **36**, 223-224. Two forms of *Maianthemum bifolium* occur in Japan; one bearing ciliate leaf-margins is distributed in Honshu, while the other with serrate leaf-margins occurs in Hokkaido and northwards.

Outside Japan both forms apparently grow together.—[D.H.K.]

594/1. FRITILLARIA MELEAGRIS L. Trist, P. J. O., 1961, An ecological study of Fritillaria meleagris L., *Trans. Suffolk Nat. Soc.*, **11**, 392-399.

605/9. JUNCUS EFFUSUS L. Agnew, A. D. Q., 1961, The ecology of Juncus effusus L. in North Wales, *J. Ecol.*, **49**, 83-102.

607. ALLIUM. Krochmal, A., 1960, Germination studies of ariel bulblets of Allium vineale L. and A. canadense L., *Amer. Midl. Nat.*, **63**, 497-508.

607/5. ALLIUM VINEALE L. Lazenby, A., 1960, Adaptability in Allium vineale, in Harper, J. L., *The Biology of Weeds*, 223-235.

615. SISYRINCHIUM. Löve, A. & D., 1961, Some nomenclatural changes in the European flora, 1. Specific and supraspecific categories, *Bot. Not.*, 114, 33-47. The authors have pointed out previously (*Bot. Not.*, **111**, 367, 1958) that the species of *Sisyrinchium* found in marshy meadows and hillsides in western Ireland appears to be distinct from the N. American *S. bermudiana* to which it has been referred. It is, in their opinion, an endemic Irish species, and is now described as **S. hibernicum** sp. nov. One of the strongest factors for separating the Irish and N. American plants is that the former has a chromosome number of $2n = 64$, which is different from all other taxa known in the genus.—[D.H.K.]

624→ ORCHIDACEAE. Duperrex, A., 1961, *Orchids of Europe.* Pp. xiii + 15-235. London. Price 25/-. A translation by A. J. Huxley of *Orchidées d'Europe* (1955).—[D.H.K.]

624→ ORCHIDACEAE. Engel, R., 1961, Observations sur quelques Orchidées critiques d'Alsace et des Vosges, *Bull. Soc. Bot. France*, **106** (85th. sess. extr.), 155-161. Notes on the ecology, distribution and diagnostic characters of several orchidaceous species, including hybrids. Particular attention is given to *Dactylorchis maculata*, *D. maculata* subsp. *fuchsii*. *D. incarnata* and *D. traunsteineri*. Diagrams illustrate the notes.—[E.B.B.]

624→ ORCHIDACEAE. May, R. M., 1961, Wild orchids of France, *Rep. Third. Intern. Rock. Gard. Plant Conf.*, 1961, 24-32. A semi-popular account of the genera and species of *Orchidaceae* found in France.—[D.H.K.]

628/1. LISTERA OVATA (L.) R. Br. Wanless, T. W., 1961, The flowering of the Twayblade and Frog Orchid in 1961, *Vasc.*, **46**, 12. Records the apparent abundance of *Listera ovata* and *Coeloglossum* *viride* in C. Durham in 1961. In particular *L. ovata* was collected freely in places not previously known to produce the plant.

The same abundance of the two species was noted in several other localities in Northumberland.—[D.H.K.]

635/1. COELOGLOSSUM VIRIDE (L.) Hartm.—See 628/1. LISTERA OVATA (L.) R. Br.

640. OPHRYS. Virot, R. & Aymonin, G., 1960, Quelques remarques à propos de deux Ophrys critiques récoltés dans les Grandes Causses, *Cahiers des Nat.*, **16**, 57-67. Two unusual *Ophrys* found in the Department of Aveyron are described in detail and illustrated. The first is given as *O. muscifera* var. *bombylifera* Bréb., distinguished by shape and colour of labellum; the second as *O. aranifera* subsp. *arachnitiformis* (Gren. & Phil.) E. G. Camus, distinguished mainly by sepals and lateral petals.—[E.B.B.]

642/3. ORCHIS SIMIA Lam. Wilks, H. M., 1960, The rediscovery of Orchis simia Lam. in Kent, 2. Orchis simia in East Kent, *Trans. Kent F.C.*, **1**, 50-55. An account of the rediscovery of *Orchis simia* in E. Kent in 1955. The habitat is described, but prudently not localised, and details are given of the flowering of the plants in 1956-1958. A list of associated plants is given.—[D.H.K.]

642/3. ORCHIS SIMIA Lam. Rose, F., 1960, The rediscovery of Orchis simia Lam. in Kent. 1. Foreword, *Trans. Kent F.C.*, **1**, 50. A short note on the rediscovery of Orchis simia in W. Kent in 1952.—[D.H.K.]

642/5. ORCHIS MORIO L. Doulton, J. F. H., 1961, The green-veined orchid, *Rep. Rugby School N.H.S.*, **94**, 10-12. An account of studies carried out during the three years 1958-1960 on a colony of *Orchis morio* growing on the bank of a railway cutting near Rugby.—[D.H.K.]

646/1. ACORUS CALAMUS L. Baranov, A., 1960, On the case of sprouting of the seeds of Acorus calamus in North Manchuria, *Phyton*, **9**, 21-23.

647/1. CALLA PALUSTRIS L. Caulton, E., 1961, Calla palustris Linn. from Allestree Park lake, 1960, *Trans. Derby N.H.S.*, **2**, 16-17. *Calla palustris* has been found in Allestree Park lake, Derby. It is believed to have been introduced by water fowl.—[D.H.K.]

648/1. LYSICHITON AMERICANUS Hultén & St. John. Peters, J. V., 1960, Rapid spreading of Lysichitum camstchaticum, *Irish Nat. J.*, **13**, 182-183. In 1956 five plants of *Lysichiton americanus* were noted at intervals on the banks of the Ballynahinch River near Montalto, Ballynahinch. They were presumed to be escapes from Montalto garden. During 1960 the author visited the area and counted a total of 136 plants spread over a distance of one and a quarter miles. Seeds of the plant had apparently been spread by water currents, and it had spread to adjacent marshland and woodland.—[D.H.K.]

649. ARUM. Dormer, K. J., 1960, The truth about pollination in Arum, *New Phyt.*, **59**, 298-301.

655. SCIRPUS. Koyama, T., 1958, Taxonomic study of the genus Scirpus Linné, *J. Fac. Sci. Univ. Tokyo, Sect*, 3, *Botany*, **7**, 271-366.

656. ELEOCHARIS. Lewis, K. R. & John, B., 1961, Hybridisation in a wild population of Eleocharis palustris, *Chromosoma*, **12**, 433-448. Twenty-nine inflorescences from plants of *Eleocharis palustris* in a small

area of Port Meadow, Oxford, were found to include four types. Two of these were the recognized subsp. *vulgaris*, $2n=38$, and subsp. *palustris* (*microcarpa*), $2n=16$. There were seven of the former and ten of the latter.

Plants with $2n=27$ were also found and these are considered to be F_1 hybrids between the two subspecies.

The possible cause of the wide chromosome variations in the genus are discussed.—[D.H.K.]

656. ELEOCHARIS. Podlech, D., 1960, Die Arten der Eleocharis palustris-Gruppe in Bayern, *Ber. Bayer. Bot. Ges.*, **33**, 105. An account of the Bavarian species of *Eleocharis* with a key to their identification. —[D.H.K.]

663. CAREX. Podlech, D. & Patzke, E., 1960, Bestimmungsschlussel für die Arten der Carex flava-Gruppe in Bayern, *Ber. Bayer. Bot. Ges.*, **33**, 106. An account of the Bavarian segregates of *Carex flava* L. agg. with a key to their identification.—[D.H.K.]

663/23. CAREX STRIGOSA Huds. Poelt, J., 1960, Carex strigosa, eine übersehene Segge der Bayerischen flora, *Ber. Bayer. Bot. Ges.*, **33**, 107.

664→ GRAMINEAE. Bowden, W. M., 1961, Chromosome numbers and taxonomic notes on northern grasses, 4. Tribe Festuceae: Poa and Puccinellia, *Canad. J. Bot.*, **39**, 123-128. Chromosome numbers are given for some Canadian grasses, including *Poa glauca* $2n=42$, 50, 56, 64, 65, 70, 75 & 78; *P. palustris*, $2n=28$, 30 & 32; *P. pratensis*, $2n=28$, 42, 44, 56, c. 66, 67, 70, 74, c. 78, c. 82, 84, 86, 88 & c. 124 and *P. trivialis*, $2n=14$.—[D.H.K.]

664→ GRAMINEAE. Carnahan, H. L. & Hill, H. D., 1961, Cytology and genetics of forage grasses, *Bot. Rev.*, **27**, 1-162.

664→ GRAMINEAE. Clouston, D., 1961, Identification of grasses in non-flowering condition, *J. Sports Turf Research Inst.*, **10**, 146-155. A key and illustrations are provided to the identification of grasses in a non-flowering state.—[D.H.K.]

664→ GRAMINEAE. Gram, K., 1961, The inflorescence of the grasses, *Bot. Tidsskr.*, **56**, 293-313.

664→ GRAMINEAE. Paunero, E., 1959, Las Aveneas españolas, 4. *An. Jard. Bot. Madrid*, **17**, 257-376. Further studies on Spanish grasses, covering the genera *Helictotrichon*, *Arrhenatherum*, *Koeleria* and *Gaudinia*.—[D.H.K.]

664→ GRAMINEAE. Prat, H., 1961, Vers une classification naturelle des Graminées, *Bull. Soc. Bot. France*, **107**, 32-79.

670. FESTUCA. Claustres G., 1960, Festuca des Pyrénées, 1. La répartition géographique des taxa dans l'ensemble de la chaîne, *Bull. Soc. Hist Nat. Toulouse*, **95**, 111-123. Eight "Hackelian" species of Festuca are found in the Pyrenees, five polymorphic, viz. *F. ovina*, *F. rubra*, *F. elatior*, *F. pumila*, *F. paniculata*, and three monomorphic, viz. *F. borderei*, *F. gigantea*, *F. altissima*. These comprise eighty-two taxa, which are listed, sixteen being endemic, including one species—*F. borderei*. The distribution of the endemics is studied first and of the wider-spread taxa second; it is stated that fescues are valuable as phytogeographic or eco-anatomical indicators.—[E.B.B.]

670. FESTUCA. Gagnieu, A. & Braun, A., 1961, Observations caryologiques sur les Festuques de la flore d'Alsace, *Bull. Soc. Bot. France*, **106** (85th sess. extr.), 142-144. Chromosome counts taken of species of *Festuca* found in Alsace show only one caryotype for the broad-leaved species, and only one again for the narrower-leaved species, including the *F. ovina* complex, although polyploidy is recognised in these species. A description and plate are given of the hybrid × *Festulolium loliaceum* on which further investigation is proposed.—[E.B.B.]

670. FESTUCA. Rauschert, S., 1960, Studien über die Systematik und Verbreitung der thüringischen Sippen der Festuca ovina L. s. lat., *Fedde. Rep.*, **63**, 251-283.

678. DACTYLIS. Borrill, M., 1961, Dactylis marina Borrill, sp. nov., a natural group of related tetraploid forms, *J. Linn. Soc., Bot.*, **56**, 431-439.

678. DACTYLIS. Borrill, M., 1961, The pattern of morphological variation in diploid and tetraploid Dactylis, *J. Linn. Soc., Bot.*, **56**, 441-452.

678. DACTYLIS. Borrill, M., 1961, Epidermal characteristics in the diploid subspecies of Dactylis glomerata L., *J. Linn. Soc., Bot.*, **56**, 453-458.

678. DACTYLIS. Borrill, M., 1961, A note on the experimental taxonomy of Dactylis L.: material in the herbarium of the Welsh Plant Breeding Station, Aberystwyth, *Proc. Linn. Soc.*, **172**, 207.

678/1. DACTYLIS GLOMERATA L.—See 712/1. ANTHOXANTHUM ODORATUM L.

679/2. CYNOSURUS ECHINATUS L. Hisauch, K., 1961, A new alien grass found in Hokkaido, *J. Jap. Bot.*, **36**, 244. *Cynosurus echinatus* has occurred as an adventive in Hokkaido. It is new to Japan.—[D.H.K.]

683. BROMUS. Hanna, M. R., 1961, Cytological studies in Bromus species. Section Bromopsis, *Canad. J. Bot.*, **39**, 757-773.

683. BROMUS. Tournay, R., 1961, La nomenclature des sections du genre Bromus L. (Gramineae), *Bull. Jard. Bot. Brux.*, **31**, 289-299. Of the genera into which Nevski divided *Bromus* sensu lato, *Trisetobromus* characterised by geniculate awns is maintained. Five sections are then given for subdividing the genus: *Bromopsis* Dumort.; type species *Bromus ramosus* Huds.; *Genea* Dumort., type species *Bromus sterilis* L., *Nevskiella* (Krecz. & Vved.) Tournay, type species *Bromus gracillimus* Bunge; *Bromus*, type species *B. secalinus* L.; *Ceratochloa* (Beauv.) Griseb. in Ledeb., type species *Bromus willdenowii* Kunth (*B. unioloides* Kunth).—[E.B.B.]

692. AVENA. Storhaugen. O., 1961, Floghavre, Avena fatua L. i Norge, *Blyttia*, **1961**, 109-124. *Avena fatua* is widespread in Norway, and a number of forms occur. In particular the hairless type appears to have become more common during the last century.

A. strigosa was common formerly but has now become rare, while *A. ludoviciana* has been noted only twice. *A. macrocarpa* Briq. is sometimes sold for ornamental purposes.—[D.H.K.]

695/1. HOLCUS LANATUS L. Beddows, A. R., 1961, Holcus lanatus L. (Biological Flora), *J. Ecol.*, **49**, 421-430.

696/1. DESCHAMPSIA CESPITOSA (L.) Beauv. Mücke, T., 1960, Eine vivipare Form der Deschampsia caespitosa (Rasenschmiele) bei Lünen in Westfalen, *Willdenowia*, **2**, 602-603.

700. CALAMAGROSTIS. Wasiljew, W. N., 1960, Das System der Gattung Calamagrotis Roth, *Fedde. Rep.*, **63**, 229-251.

700/1. CALAMAGROSTIS EPIGEJOS (L.) Roth. Junkinson, D. H., Davies, E. W. & Frost, L. C., 1961, Chromosome numbers in Calamagrostis epigejos (L.) Roth from southern Britain, *Proc. Bristol Nat. Soc.*, **30**, 145-150. Tutin, in Clapham, Tutin and Warburg, *Flora of the British Isles*, 1478 (1952) gives $2n=28$, 56; 35, 42, 49; c. 70, for *Calamagrostis epigejos*. The authors have examined plants from twelve scattered localities in southern Britain, ranging from Pembroke and Devon to Sussex and Cambridge, and found that all were probably diploid with $2n=28$.—[D.H.K.]

701/7. AGROSTIS SCABRA Willd. Neumann, A., 1960, Ein zweites Vorkommen von Agrostis scabra Willd. in Mitteleuropa, *Ber. Bayer. Bot. Ges.*, **33**, 101-102.

712/1. ANTHOXANTHUM ODORATUM L. Böcher, T. W., 1961, Experimental and cytological studies on plant species, 6. Dactylis glomerata and Anthoxanthum odoratum, *Bot. Tidsskr.*, **56**, 314-335. Thirty-two strains of *Dactylis glomerata* and forty of *Anthoxanthum odoratum* from various parts of Europe have been studied in cultivation and cytologically. In *D. glomerata* three strains were diploid and varied considerably.

Montane tetraploids of *A. odoratum* were found to be very distinct from the diploids found in the same areas.—[D.H.K.]

715/1. NARDUS STRICTA L. Chadwick, M. J., 1960, Nardus stricta, a weed of hill grazings, in Harper, J. L., *The Biology of Weeds*, 246-256.

716. SPARTINA. Boyle, P. J. & Kavanagh, J. A., 1961, A spartinetum at Baldoyle in Ireland, *Nature*, **192**, 81-82. A study of an extensive and spreading area of *Spartina* at Baldoyle Estuary has revealed considerable variation in the plants, which vary in stature from short stunted ones closely resembling *S. maritima*, to tall vigorous ones which exceed *S. alterniflora* by as much as a foot. This range in stature is wider than that usually ascribed to the amphidiploid *S. alterniflora* × *maritima*. Variation in inflorescence is also noticeable.

Extreme stunting and a red colouration characterise small clones growing in sandy areas bordering the muddy reaches of the estuary. Similar stunting has already been reported by Chater and Jones for *Spartina* plants growing in similar habitats by the Dovey Estuary, N. Wales.

Male sterility has been used to distinguish the diploid hybrid *S. alterniflora* × *maritima*, with $2n=63$, from the tetraploid with $2n=126$, but in the Baldoyle colonies male sterility is quite frequent in clones with $2n=126$.

The authors suggest, therefore, that until some clear-cut morphological distinction is noted the name *S.* × *townsendii* is equally applicable to both known cytotypes.—[D.H.K.]

716/2 × 1. Spartina × townsendii H. & J. Groves. Carrothers, E. N., 1960, Spartina townsendii H. & J. Groves in Counties Louth and Down, *Irish Nat. J.*, **13**, 188.

716/2 × 1. Spartina × townsendii H. & J. Groves. Goodman, P. J. & Williams, W. T., 1961, Investigations in 'die-back' in Spartina townsendii agg. 3. Physiological correlates of 'die-back', *J. Ecol.*, **49**, 391-398.

Nitella flexilis Agardh. Hilton, S. & Parrott, G. J., 1961, Freshwater studies in Derbyshire, 1, *Trans. Derby N.H.S.*, **2**, 14-16. First observed four years ago in Allestree Park lake, this charophyte was recently collected and determined as *Nitella flexilis*, seemingly a first record for the vice-county. The only other species of *Nitella* recorded for Derby is *N. opaca* and it is suggested that further search should be made and herbarium material checked.—[S.P.P.]

Tolypella. Corillion, R., 1960, Tolypella salina sp. nov., Charophycées nouvelles des marais de Croix-de-Vie (Vendée). *Rev. Algol.*, **5**, 198-207. A new species, *Tolypella salina*, is described and illustrated by diagrams and photographs. It differs from *T. nidifica* ($n=15$) and *T. glomerata* ($n=42$) in chromosome number ($n=50$), and in habitat, occurring in salt-marshes. It also differs from *T. nidifica* in having a smaller oospore and from *T. glomerata* in having a smooth oospore membrane except for slightly tuberculate tips.—[S.P.P.]

TOPOGRAPHICAL

0, Channel islands. Le Sueur, F., 1961, Botanical report for 1960, *Ann. Bull. Soc. Jersiase*, **18**, 15-20. Gives a number of interesting records for Jersey, in particular *Ranunculus paludosus* has been found to be much more widespread in the island than was hitherto realised.

Clapham, in Clapham, Tutin and Warburg, *Flora of the British Isles*, 277 (1952), states that *Silene conoidea* is established in Jersey. Careful search has failed to reveal the plant on the island, and further investigation has shown that the record is erroneous, being based on the casual occurrence of *S. conica* in Jersey.—[D.H.K.]

1, W. Cornwall. Sargent, H. B., 1961, *A Natural History of Porthleven in the County of Cornwall*. Pp. 65. Slough. Flora, pp. 32-51.

3, S. Devon. Phillips, V. I., 1961, A local salt-marsh, *Trans. & Proc. Torquay N.H.S.*, **13**, 4-8. Describes the vegetation of a saltmarsh at Netherton Point on the right bank of the Teign estuary.—[D.H.K.]

4, N. Devon. Langham, A. & F., 1960, *Lundy, Bristol Channel*. Pp. 182. Bradford. Price, 22/6. Flora, pp. 137-146.

5, S. Som. Ranwell, D. S., 1961, Spartina salt-marshes in Southern England, 1. The effects of sheep grazing at the upper limits of Spartina marsh in Bridgwater Bay, *J. Ecol.*, **49**, 325-340.

6, N. Som. & 34, W. Glos. Sandwith, C. I. & N. Y., 1961, Bristol botany in 1960, *Proc. Bristol Nat. Soc.*, **30**, 107-112. Gives a number of interesting records from the Bristol area including several new vice-county records.—[D.H.K.]

7 & 8. WILTS. Grose, D., 1961, Wiltshire plant notes, 21 (Fourth Supplement to the Flora of Wiltshire), *Wilts. Arch. & N.H. Mag.*, **58**, 82-85.

9, DORSET. Anon., 1961, Botanical report, *Rep. Bryanston School N.H.S.*, **1959-60**, 15-18. Gives a number of records for Dorset [D.H.K.]

9, DORSET. Good, R.d'O., 1961, Botany, *Proc. Dorset N.H. & Arch. Soc.*, **82**, 40. Gives a few records for Dorset.—[D.H.K.]

9, DORSET. Samuel, E. M., 1960, Botany, *Proc. Dorset N.H. & Arch. Soc.*, **81**, 30. Gives a few records for Dorset.—[D.H.K.]

9, Dorset & 11, S. Hants. Hunt, A. K., 1961, Botany, *Proc. Bournemouth Nat. Sci. Soc.*,**50**, 27-28. Gives a number of records from the Bournemouth area.—[D.H.K.]

14, E. SUSSEX. Brightman, D., 1961, Notes on the local fauna and flora: plants, *Hastings & E. Sussex Nat.*, **9**, 144-145.

15, E. KENT. Anon., 1961, The Burham Down Survey—a preliminary report, *Trans. Kent F.C.*, **1**, 119-141. A preliminary account of the natural history of Burham Down, a portion of the chalk escarpment of the North Downs, north of Maidstone. Lists of plants are included.—[D.H.K.]

15, E. KENT. Nunns, V. J., 1957, The effect of the coppicing cycle on the ground flora of some woodlands in the Hawkhurst district of Kent, *Trans. Kent F.C.*, **1**, 22-34.

15-16. KENT. Rose, F., 1960, Botanical records for Kent, 1955-58—Vascular plants, *Trans. Kent F.C.*, **1**, 56-65.

15-16, KENT. Rose, F., 1961, Records for 1960, Botanical, *Bull. Kent F.C.*, **6**, 8-11.

15-16, KENT. Rose, F. & Wilks, H. M., 1960, The rediscovery of Orchis simia Lam. in Kent, *Trans. Kent F.C.*, **1**, 50-55.

16, W. KENT, 17. SURREY, 18-19, ESSEX, 20, HERTS, 21. MIDDLESEX, & 24, BUCKS. Bangerter, E. B., 1961, The botany of the London Area, *Lond. Nat.*, **40**, 6-16. A Summary of work on the flora of the London Area by members of the London Natural History Society, being the Presidential address given to the Society in December 1959.—[D.H.K.]

16. W. KENT, 17, SURREY, 18. S. ESSEX, 20. HERTS, 21. MIDDLESEX, and 24, BUCKS. Lousley, J. E., 1961, Botanical records for 1960, *Lond. Nat.*, **40**, 17-22. Gives details of the more interesting records made in the London Area during 1960.—[D.H.K.]

16, W. KENT & 17, SURREY. Jones, A. W., 1961, The vegetation of South Norwood or Elmers End Sewage Works, *Lond. Nat.*, **40**, 102-114.

17, SURREY. Hillman, E. M. & Castell, C. P., 1961, Headley Heath Survey: a ten-year study of the re-colonization by plants of denuded heathland, *Lond. Nat.*, **40**, 91-101.

17, SURREY. Shaw, H. K. A., 1961, Additions to the wild fauna and flora of the Royal Botanic Gardens, Kew, 24, *Kew Bull.*, **15**, 169-191. Gives a number of additions to the wild flora of the Royal Botanic Gardens, Kew, and includes a note on the spread of *Bromus carinatus*, a Californian grass which escaped from the Gardens. Its present distribution along the Thames and elsewhere is given.—[D.H.K.]

17, SURREY. Welch, B., 1961, Petersham Common, Surrey, *Lond. Nat.*, **40**, 22-27. Notes on the changes in the flora of Petersham

Common, near Richmond, since 1943, with an annotated list of plants seen there.—[D.H.K.]

18-19, Essex. Ward, B. T., 1961, Essex plant notes, 1959, *Essex Nat.*, **30**, 267-268. Gives details of some of the more interesting plants found in Essex during 1959.—[D.H.K.]

20, Herts. Owens, M. & Edwards, R. W., 1961, The effects of plants on river conditions. 2. Further crop studies and estimates of net productivity of macrophytes in a chalk stream, *J. Ecol.*, **49**, 119-126. Further studies on the aquatic vegetation of the river Ivel.—[D.H.K.]

20, Herts and 30, Beds. Meyer, D. & H., 1957, Plant records, 1953-56, *J. Letchworth & Distr. Nat. Soc.*, **12**, 20-25.

21, Middlesex. Kent, D. H., 1961, A contribution to the flora of Central London: Addenda, *Lond. Nat.*, **40**, 28.

21, Middlesex. Kent, D. H., 1961, The flora of Middlesex walls, *Lond. Nat.*, **40**, 29-43. A four year study of the vegetation of Middlesex walls revealed the occurrence of 204 species of flowering plants and vascular crytogams. The commonest species being *Poa annua*, *Dryopteris filix-mas*, *Senecio squalidus*, *Chamaenerion angustifolium* and *Cymbalaria muralis*, in the sequence given.

Various aspects of the wall flora are discussed and comparison made with the flora of walls in Cambridge and Durham.—[D.H.K.]

25-26, Suffolk. Bellamy, D. J. & Rose, F., 1961, The Waveney-Ouse valley fens of the Suffolk-Norfolk border, *Trans. Suffolk Nat. Soc.*, **11**, 367-385. An ecological study of the Waveney-Ouse valley fens.—[D.H.K.]

25-26, Suffolk. Willis, J. C. N., 1961, Some flora records of 1960, *Trans. Suffolk Nat. Soc.*, **11**, 390-392.

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31, Hunts. Richens, R. H., 1961, Studies on Ulmus, 4. The village elms of Huntingdonshire and a new method for exploring taxonomic discontinuity, *Forestry*, **34**, 47-64.

36, Hereford. Kendrick, F. M., 1961, Report on botany, 1960, *Trans. Woolhope Field Nat. Club*, **36**, 371-372. *Euphorbia cyparissias* from the Great Doward, and *Carex laevigata* from Nash Woods are reported as new to the county. The previous record for the latter was based upon a locality in Monmouthshire.—[A.E.W.]

37, Worcs. Day, F. M., 1961, Recording, *Trans. Worcs. Nat. Club*, **11**, 131-135. Discusses the disappearance of a number of native species, and the introduction and spread in Britain, in particular in Worcestershire, of various alien species, including *Cardaria draba*, *Matricaria matricarioides*, *Chamaenerion angustifolium* and *Azolla filiculoides*.

The importance of recording new alien and uncommon British species is stressed.—[D.H.K.]

37, Worcs. Day, F. M., 1961, R. F. Towndrow's herbarium, *Trans. Worcs. Nat. Club*, **11**, 146-150. Gives a number of interesting Worcestershire records from the herbarium of R. F. Towndrow (1845-1937) now preserved at Malvern Public Library.—[D.H.K.]

37, Worcs. Day, F. M., 1961, Plant records from Worcestershire, 1949-59, *Trans. Worcs. Nat. Club*, **11**, 150-155.

38, Warwick. Allen, D. E., 1961, *A First Supplement to 'The Flora of the Rugby District'*. Rugby School N.H.S., pp. 4. Rugby.

38, Warwick. Clarke, H., 1961, The floral year, 1960, *Ann. Rep. Warwick, N.H.S.*, **7**, 22-24.

38, Warwick. Cooper, G., 1961. Further notes on the flora of the Percy Estate, Warwick, *Ann. Rep. Warwick N.H.S.*, **7**, 20-21.

38, Warwick, Cooper, G., 1961, Further observations on the recent spread of the rayed-form of Senecio vulgaris in this area, *Ann. Rep. Warwick N.H.S.*, **7**, 18-19.

38, Warwick. Doulton, J. F. H., 1961, The green-veined orchid, *Rep. Rugby School N.H.S.*, **94**, 10-12. A study of a colony of *Orchis morio* near Rugby.—[D.H.K.]

39, Stafford. Edees, E. S., 1960, Botany, *Trans. N. Staffs. F.C.*, **93** & **94**, 71-80. Gives details of the more interesting records made in Staffordshire in 1958 and 1959, including an account of *Cardamine bulbifera* in the county.—[D.H.K.]

41, Glam. Goodman, G. T., 1961, Plants and man at Oxwich, *Gower*, **13**, 32-40. An account of man's effect on the flora of Oxwich, Gower Peninsula.—[D.H.K.]

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41, Glam. Thomas, H., 1960, Flowers of the limestone, *Gower*, **12**, 40-41. An account of some of the limestone plants of the Gower Peninsula.—[D.H.K.]

41, Glam. Wade, A. E., 1961, Glamorgan botanical notes, 1959, *Trans. Cardiff Nat. Soc.*, **88**, 21.

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41, Glam. Webb, J. A., 1958, The Ferns and fern-allies of Gower, *Gower*, **10**, 75-78.

41, Glam. Webb, J. A., 1959, Ferns and fern allies at Gower Wallica, *Gower*, **11**, 47-48.

43, Radnor, 44, Carm., 45, Pemb., 46, Card., 48, Mer., 49, Caern., 50, Denb. & 52, Anglesey. Benoit, P. M., 1961, Field notes: plants, *Nature in Wales*, **6**, 135-139 & **7**, 21-24 & 67-68, 112-115 & 170-173. Includes many interesting records, as well as notes on *Salicornia perennis* and variation in flower colour of *Geranium robertianum* in Merioneth. An account of Merioneth species of *Orchidaceae* seen in 1960 is also given. —[D.H.K.]

45, Pemb. George, M., 1961, The flowering plants and ferns of Dale, Pembrokeshire, *Field Studies*, **1**.

48, Mer. Benoit, P. & Richards, M., 1961, A contribution to a Flora of Merioneth, *Nature in Wales*, 7, 47-66, 93-111 & 147-169. An annotated list of the plants known to have been seen in Merioneth during the last twenty years, with details of frequency, habitats and localities.—[D.H.K.]

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53-54, Lincoln. Gibbons, Miss E. J., 1959-60, *Botany*, *Trans. Lincs. Nat. Union*, **14**, 228-229 & **15**, 37-39.

56, Nottingham. Howitt, B. M., 1961, Midland clay woodland, *Wild Flower Mag.*, **331**, 26-27. An account of some of the plants found in the Nottinghamshire woodlands.—[D.H.K.]

57, Derby. Holme, L., 1961, The changing countryside, *Trans. Derby N.H.S.*, **1**, 4-5. Notes on the destruction of stations for *Veronica scutellata* and *Oenanthe fistulosa* near Derby by the tipping of rubbish, and the disappearance of other species through changes in accompanying vegetation.—[D.H.K.]

58, Chester. McMillan, N. F., 1961, The colonisation of a brackish mill-dam at Bromborough, Cheshire, *Liverpool Bull.*, **9**, 30-37. Describes the gradual silting up of the dam since 1933, and its gradual and almost complete colonisation by *Scirpus maritimus*.—[A.E.W.]

60, W. Lancs., 69, Westmorland, 69b, N. Lancs. & 70, Cumberland. Stalker, N. M., 1960, Plant records, 1957-60, *The Changing Scene*, **2**, 68-70.

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66, Durham. 'T.C.B.', 1961.Flowering plants on the Roman Camp at Lanchester, *Vasc.*, **46**, 12. Plants noted growing on the wall at the Roman Camp at Lanchester included *Arabidopsis thaliana*, *Cymbalaria muralis*, *Erophila* sp., *Veronica chamaedrys*, *V. arvensis*, *Aphanes* sp., *Galium saxatile*, *G. verum*, *Arenaria serpyllifolia* and *Sagina procumbens*.—[D.H.K.]

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73. Kirkcudbright. Stirling, A. McG., 1960, Kirkcudbright plant notes, 1959, *Trans. & J. of Proc. Dumfries & Galloway N.H. & Antiq. Soc.*, **38**, 165-167.

76, Renfrew, 86, Stirling, 87, W. Perth & 88, Mid Perth. Mackechnie, R., 1961, Noteworthy plants, 1959, *Glasgow Nat.*, **18**, 147. Includes a number of new vice-county records.—[D.H.K.]

110, Outer Hebrides. McVean, D. N., 1961, Flora and vegetation of the islands of St. Kilda and North Rona in 1958, *J. Ecol.*, **49**, 39-54.

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H.31, Louth & H.38, Down. Carrothers, E. N., 1960, Spartina townsendii H. & J. Groves in Counties Louth and Down, *Irish Nat. J.*, **13**, 88.

H.39, Antrim. Carrothers, E. N., 1960, Plants of The Skerries, Co. Antrim, *Irish Nat. J.*, **13**, 188. A list is given of twenty-two plants noted in June 1957 on the Skerries, a line of small islets 1½ miles off Portrush. In stormy weather the N. Atlantic drenches these small islets, the largest of which covers about twelve acres and shelves from about 50 feet to sea level.—[D.H.K.]

ECOLOGICAL (See also TOPOGRAPHICAL)

Barry, J. P., 1960, Contribution à la phytogéographie du Massif de la Vanoise (Savoie), *Rev. Gen. Bot.*, **67**, 257-297. The vegetation of calcareous slopes, of gullies and moraines in the area is studied and illustrated by tables. Special emphasis is given to *Sesleria caerulea*, which acts as a "fixer" in loose ground.—[E.B.B.]

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(L.) Löve & Löve (*S. anglica* L.); **S. gallica** subsp. **quinquevulnera** (L.) (Löve & Löve (*S. quinquevulnera* L.): **Cochlearia groenlandica** subsp. **scotica** (Druce) Löve & Löve (*C. scotica* Druce); **Amelanchier canadensis** subsp. **confusa** (Hyl.) Löve & Löve (*A. confusa* Hyl.); **Armeria maritima** subsp. **planifolia** (Syme) Löve & Löve (*A. vulgare* var. *planifolia* Syme) **Gentianella campestris** subsp. **baltica** (Murb.) Löve & Löve (*G. baltica* Murb.) and **Artemisia norvegica** subsp. **scotica** (Hultén) Löve & Löve (*A. norvegica* var. *scotica* Hultén).—[D.H.K.]

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EXHIBITION MEETING, 1961

An Exhibition Meeting was held in the library of the Linnean Society, Burlington House, Piccadilly, London, W.1, on the afternoon of Saturday, November 25, 1961.

About 300 members and guests attended, and exhibits were arranged by 43 individuals and institutions. An account of some of these exhibits, based on notes supplied by exhibitors, is given below.

ULEX EUROPAEUS × *GALLII**

Specimens of *Ulex europaeus*, *U. gallii* and the hybrid between them were exhibited from Merioneth, and the characters used to distinguish the three taxa were listed. The hybrid may have been overlooked in view of its intermediate characters, but can be recognised by its sterility. —P. M. Benoit.

A NEW SHODDY ALIEN

A living specimen was shown of *Galenia africana* L. (Aizoaceae), a native of S. Africa, det. J. P. M. Brenan. The plant was found as a "shoddy" alien at Ampthill, Bedfordshire in 1959, and has since been retained in cultivation; this year (1961) it flowered and fruited.

Seedlings of the species were noted at Charlton, Worcester, in autumn 1961.—H. J. M. Bowen.

PYROLA MINOR L. IN DORSET

Herbarium specimens of *Pyrola minor* L. from Dorset were exhibited.

A colony of about 200 plants of this species discovered near Moreton, v.c. 9, Dorset, this year proved to be a new county record. It is a scarce plant in S.-W. England, as there are only three stations in S. Wilts., a few in Hants and none in Devon and Cornwall. The colony was growing in deep shade under pine trees, on an acid soil which was rich in organic matter. It was well established but may have been originally introduced with pine seedlings; other noteworthy plants in the same area include *Mentha pulegium*, *Lobelia urens* and *Viola lactea*.—H. J. M. Bowen.

THE SPREAD OF *POLYGONUM CUSPIDATUM*

Maps were shown of the stages of the spread of *Polygonum cuspidatum* as an escape from cultivation since its introduction from Japan in 1825.

The earliest records were mainly in the west, particularly in South Wales and Cornwall, with scattered random occurrences ranging from Aberdeen, Oldham and London and a few other places. The spread in the west has evidently been much more rapid and with greater power of naturalisation than in the east, where, apart from the London area it would appear, from the data so far compiled, to have spread mainly in the last 10 or 20 years. It is suggested that this difference might be due to some climatic deterrent such as late spring frost.—A. P. Conolly.

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*See Plant Notes—Ed.

SALICORNIA PUSILLA IN BRITAIN

Salicornia pusilla, a local plant of the upper part of coastal saltmarshes, shows several peculiarities not present in other species of the genus. Thus its flowers are single, instead of being in 3-flowered cymules, and the seeds are not shed at maturity, but are retained in the cortical tissues. These features were illustrated in the exhibit by drawings and photographs.

Seed dispersal is by the shedding of branches, complete with contained seeds. These branches float by tidal action to the characteristic level on the saltmarsh just below high water mark, and close to the usually conspicuous zone of *Halimione portulacoides*.

Photographs were also included to show the great range in growth form in *S. pusilla*, whilst a distribution map demonstrated that, although the species is found in almost all suitable habitats in south and south-east England, it also occurs in a few more widely separated localities, such as in south Wales, the south coast of Ireland and in a few marshes in Brittany.—D. H. Dalby.

SALICORNIA IN IRELAND

The exhibit showed the result of preliminary observations made on the genus *Salicornia* in Ireland. It consisted of a series of photographs showing entire plants ×½ and a portion of the fertile spikelet ×10. Attention has so far been directed mainly to the south and east coasts.

S. perennis Mill. and *S. pusilla* Woods were recognised as distinct species. The former has not been previously recorded in Ireland. Nine further forms of doubtful taxonomic rank were recognised. Among the presumed diploids one (perhaps referable to *S. ramosissima* Woods) was shown to vary greatly in the length of the fertile spikelets and evidence was produced that this might be phenotypic. Another was conspicuous by its very swollen fertile segments which completely covered the lateral florets. A third was notable for its prostrate habit and this was shown to be usually genetically determined. Two other forms (perhaps referable to *S. europaea* L.) were distinguished by the very narrow scarious margin to their leaves and by their exserted stamens. These differed from one another by one having long terminal spikelets and long first internodes, the other having short terminal spikelets and short first internodes.

Among the tetraploids, forms with long fertile segments and tapered fertile spikelets and forms with short fertile segments and cylindrical fertile spikelets could be recognised, but populations of intermediate form were common.

One further taxon of unknown chromosome number from Co. Dublin appeared to be identical with *S. nitens* Tutin and Ball.—I. K. Ferguson.

ALIEN WILD FLOWERS OF EGYPT NATIVE IN BRITAIN

Five specimens of Egyptian weeds were shown which were collected by the exhibitor during World War II. These were:—*Taraxacum officinale* from a garden path, Nouzha, Alexandria—the first record as a wild plant in Egypt; *Trifolium repens* from a lawn, Alexandria—the first record for the Egyptian Mediterranean region; *Chenopodium album* from Alexandria; *Capsella bursa-pastoris* from Albasia, and *Anthyllis vulneraria* from the sea coast, Dekheila, near Alexandria. A history of these weeds in Egypt and Britain was briefly outlined.—J. L. GILBERT.

ARENARIA NORVEGICA GUNN. IN IRELAND

Herbarium specimens and a living plant were exhibited from the recently discovered colony of this species on the south slope of Gleninagh mountain in the Burren district of north Clare, v.c. H.9. In their natural habitat the plants were growing in shallow humus-filled crevices and solution hollows on limestone pavement at an altitude of *c.* 800 ft., and were in flower in the last week of June 1961.

The plants from the wild are closely similar to those from Scottish colonies in habit, flower dimensions and capsule characters. The leaf ciliation is perhaps a little more plentiful, a character in which there is a resemblance to Yorkshire specimens previously referred to *A. gothica* Fr. In cultivation the decumbent habit is partly lost, and the leaves of the erect shoots are fleshy and partly ciliate. There are some indications that the transplanted specimens will be perennial under greenhouse conditions.—J. HESLOP-HARRISON.

CORALLORHIZA TRIFIDA CHATELIN NEW TO YORKSHIRE

This exhibit consisted of a herbarium specimen which was picked from a colony of *Corallorhiza trifida* discovered in early June 1961, in Yorkshire, v.c. 64., mounted with a few pressed specimens of the bryophytes in which they were growing. A list of associate plants was provided. Colour transparencies were also shown of the *Corallorhiza* and other members of the family, Orchidaceae, which can be seen growing in the same area. A map showed the distribution of this orchid in Britain.—Mrs. F. HOUSEMAN.

CHROMOSOME RACES IN *SCILLA AUTUMNALIS* L.

The existence of three chromosome races in *Scilla autumnalis* was established by Battaglia in 1957. His results suggest that the diploid ($2n=14$) has a more southerly distribution than the tetraploid ($2n=28$); the geographical distribution of the hexaploid is not however known. Battaglia found the hexaploid number ($2n=42$) only in plants cultivated in the Trieste Botanic Garden, but in the Merton Catalogue, Maude (1939) has reported $2n=42$, presumably for British material. Maude's record does not cite any precise locality and in the following year she published a count of *S. autumnalis*, again unlocalised, as "$2n=44$?".

Recent work by the contributors has shown that plants collected near Kynance Cove on the Lizard Peninsula, Cornwall, are hexaploid, but that other British plants (from Hampton Court Park) are tetraploid, as are some from Cap Fréhel in Brittany.

Battaglia was unable to find any morphological correlation with chromosome number, but preliminary measurements of pollen grains by the contributors suggest that there are at least two size classes, whose geographical distributions are closely correlated with those of the diploid and tetraploid chromosome races.

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—J. McNeill and Miss M. H. Knight.

SCOTTISH PLANTS IN NEW STATIONS

Herbarium specimens and outline distributional maps were shown of the following species in which an extension of range was involved.

1. *Hierochloe odorata* (L.) Beauv.—from a rich fen in Roxburghshire (growing with *Pyrola rotundifolia*).
2. *Juncus alpinoarticulatus* Chaix.—from a poor fen in the same county (associated with *Pyrola minor*).
3. *Najas flexilis* (Willd.) Rostk. & Schmidt.—from a loch in v.c. 73.
4. *Salix lanata* L.—from a station north-west of the Caledonian Canal (1960) and remote from the main Scottish area; along with a mapping card of neighbouring plants.
5. *Calamagrostis stricta* (Timm) Koel.—from fens in the shires of Selkirk and Roxburgh.
6. *Carex limosa* L. and *C. paupercula* Michx.—showing contrasting ranges in south Scotland.—H. Milne-Redhead.

ONLY 388 DIFFICULT RUBI

The exhibit aimed at showing the ease with which *Rubus ulmifolius* can, and has been, recognised. A map was shown based on data collected by E. S. Edees, J. H. Chandler and others giving the distribution of this species. Another map made by Mr. Chandler indicated his detailed study of the species in the Stamford area.—F. H. Perring.

ATLAS OF THE BRITISH FLORA

Information, price, size and specimen page, were provided of the 'Atlas' which was published in the spring of 1962.—F. H. Perring.

TUBERARIA GUTTATA IN BRITAIN

Herbarium specimens and silhouettes were exhibited, illustrating the results of cultivation experiments on British material of *Tuberaria guttata*, together with typical specimens from wild populations.

Some taxonomic points were illustrated by graphs and diagrams:

(a) In cultivation, bracts are produced by both Channel Islands and Welsh plants. The number produced is not closely related to height of plant, or provenance, and increases in all populations as the season progresses.

(b) The logarithm of leaf breadth bears a linear relation to log leaf length. Hence length-breadth ratio is directly dependent on length, and of no greater worth as a taxonomic character.

(c) Seven characters examined were only weakly correlated.

It is evidently not possible to group the populations into any satisfactory taxa distinct from typical *T. guttata*.

A full account of the results will be published elsewhere.—M. C. F. PROCTOR.

POTENTILLA RUPESTRIS IN SCOTLAND*

Specimens were displayed of *Potentilla rupestris* from a newly discovered locality in East Sutherland. The species is new to Scotland. —D. A. RATCLIFFE.

A *MIMULUS* HYBRID WIDESPREAD IN BRITAIN

Herbarium sheets were exhibited of the putative hybrid *Mimulus guttatus* × *luteus*. These plants all show varying degrees of intermediacy between the presumed parents in corolla size and marking, as well as in the degree of pubescence.

Their pollen is completely sterile and apparently no viable seed is set. Pollinations with pollen from both *M. guttatus* and *M. luteus* (the latter of garden origin) have also failed to produce any seed, although occasionally slight swelling of the ovaries occurred.

A map was exhibited showing that specimens of these hybrid plants have so far been seen from the following vice-counties: 3, 35, 45, 48, 49, 52, 66, 90 and 91.

The variation in corolla marking which exists among these hybrid plants was shown by means of a diagram. The artificial production of this hybrid is being attempted.

The exhibitor is grateful to Miss U. K. Duncan and to the National Museum of Wales for the loan of herbarium sheets during this investigation.—R. H. ROBERTS

RECENT RECORDS FROM SCOTLAND

Herbarium specimens of interesting plants recently found or refound in Scotland, together with maps of the areas in which they were found, were exhibited.—A. A. P. SLACK.

SOME SPANISH PLANTS OF INTEREST TO BRITISH BOTANISTS

Some Spanish plants were exhibited which are 'bound up' with the British flora in any one of the three ways:—*a*. Species which are very rare or local in Britain, but are native here, or were formerly so; *b*. Species which are not native in Britain, but which are found as casuals or are naturalised here; *c*. Species which are not recorded from Britain, but which are closely related to native or naturalised British species.

The plants came from a wide range of habitats all over the non-Atlantic part of the Iberian Peninsula, which was visited in April-May of this year (1961). Habitat photographs of most of the localities from which the specimens exhibited were collected were also displayed.—C. A. STACE and A. R. SMITH.

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*See Short Notes.—ED.

VARIATION IN THE *POTENTILLA VERNA* AGGREGATE.

The *Potentilla verna* aggregate is partially apomictic and partially sexual. With hybridisation as a complicating factor, a large number of biotypes are thus formed, which show considerable variation in the characters used in orthodox taxonomy. The simple hairs of *P. tabernaemontani* were shown to vary greatly in density and posture. In contrast, *P. arenaria*, *P. gaudini* and *P. cinerea* have a proportion of stellate hairs which differ in the number of rays present. On the radical leaves, the shape of the stipules (ovate-lanceolate to linear) and the number of leaflets (3-7 (-9)) are also highly variable. Closely related species, e.g. *P. heptaphylla* and *P. aurea*, were also demonstrated, together with the approximate European distributions for the aggregate species.—G. L. Smith.

A ROSE FROM GLYCWM, CARMARTHEN

Specimens were shown of a rose, the identity of which has not been finally determined, from a banked hedge in Glycwm, Carmarthen.—I. M. Vaughan.

SPREAD OF A RUSSIAN *ALCHEMILLA* IN EUROPE

It is an interesting fact that the three commonest Alchemillas of the *vulgaris* group in cultivation in European gardens—namely, *A. mollis* (Buser) Rothm., *A. speciosa* Buser and *A. rigida* Buser—are all species with a restricted native distribution on the mountains of S.-E. Europe and S.-W. Asia. These three species seed very freely in gardens, and can often be found there labelled '*A. vulgaris*'. The recent discovery of *A. tytthantha* Juz. naturalised in Scotland (Bradshaw and Walters, 1961) has drawn attention to another species belonging to this little group of successful colonisers from the south-east.

The detailed history of the spread of *A. tytthantha* is not known. Its native home is in the mountains of the Crimea, where it is apparently locally abundant. (The original material of Juzepczuk and a specimen collected from the same area by Mrs F. E. Wrigley in July this year were exhibited.) One of the early botanical explorers of the Crimea must have gathered it, and grown it in a W. European garden in the early 19th century, from which it was widely distributed.

The Selkirk plant (a live plant of which was exhibited) could easily have been introduced accidentally from the Edinburgh Botanic Garden, where material was growing (1957) under the name '*A. vulgaris*'.

Further records of *A. tytthantha* in European gardens would be very welcome. The plant is easily recognised as follows:—Robust habit, very small flowers, obviously silkily-hairy leaves, and slightly deflexed hairs on stem and petioles. *A. xanthochlora* most closely resembles it among British Alchemillas, but has practically glabrous upperleaf-surfaces and rather ascending stem- and petiole-hairs.

REFERENCE

BRADSHAW, M. E. and WALTERS, S. M., 1961, *Watsonia*, **4**, 281.

S. M. Walters.

ELEOCHARIS AUSTRIACA HAYEK IN BRITAIN

Eleocharis austriaca Hayek was collected for the first time in Britain in July 1947, in a marshy ox-bow of the river Wharfe below Buckden, Mid-West York, v.c. 64. It was re-collected in exactly the same spot in July 1961, and so far has been detected nowhere else in the neighbourhood. It is a species widely spread in Continental Europe, allied to *E. palustris* and especially to its subsp. *microcarpa*, and also to the Scandinavian *E. mamillata*.

Herbarium specimens of both British gatherings of *E. austriaca* were shown, and drawings by Miss M. A. Grierson, prepared for a subsequent paper by S. M. Walters, exhibited the main differential features in flowers, fruit and stem anatomy of *E. austriaca* and *E. palustris* subsp. *microcarpa*.—S. M. Walters and N. Y. Sandwith.

RUMEX CRISPUS × *R. PALUSTRIS**

This hybrid was first seen certainly in Britain in July 1961 at the Eye Brook Reservoir (Leicester and Rutland). Three previous doubtful records exist.

The exhibit consisted of herbarium material, together with details of the essential characters for the identification of the hybrid and information on associated species growing in the locality.—J. R. I. Wood.

SOME INTERESTING SCOTTISH RECORDS

Herbarium specimens were displayed of recent new vice-county records, including *Ulex gallii* from perhaps its most easterly habitat in Britain in Moray, v.c. 95.—Miss M. McCallum Webster.

SILENE OTITES (L.) WIBEL AND RELATED SPECIES

Live plants were shown with a demonstration of the results of interspecific crosses between *Silene cyri* Schischk., *S. otites* (L.) Wib., *S. otites* var. *umbellata*, *S. parviflora* (Ehrh.) Pers., *S. pseudotites* Bess., *S. wolgensis* (Willd.) Bess. and *S. longiflora* Ehrh. There are 6 situations revealed: —

(1) Complete interfertility between plants of the same species from geographically separated populations (e.g., *S. otites* (Czech) × *S. otites* v. *umbellata* (Danish, a sand dune ecotype).

(2) Partial sterility between plants of the same species from geographically separated populations (e.g., *S. otites* (Czech) × *S. otites* (Italian), gives striped seedlings growing to maturity and 25% bad pollen).

(3) Partial sterility between plants of different species (e.g., *S. otites* × *pseudotites* (S. France), gives striped seedlings growing to maturity and 50% bad pollen).

(4) Sterility between plants of different species shown by white seedlings dying after germination (e.g., *S. otites* × *parviflora*).

(5) Sterility between plants of different species shown by hybrid seed which fails to germinate (e.g., *S. wolgensis* × *cyri*).

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*See 'Plant Notes'.—Ed.

(6) Failure of the cross to produce any seed (e.g., *S. cyri* × *longiflora*).

The genetical relationships of the taxa so far revealed show a good fit with the taxonomy. The section Otiteae (all the species mentioned except *S. longiflora*) forms one comparium, whilst *S. longiflora*, in a distant section of the genus, is part of a second comparium. Within the Otiteae all the species are coenospecies with the exception of *S. otites* and *S. pseudotites* which are ecospecies of a single coenospecies.—Mrs. F. Wrigley.

REPORT OF THE COUNCIL FOR 1961

The report and the audited accounts cover the period from 1st January to 31st December 1961. Comparative figures for 1960 are given in brackets unless otherwise indicated.

During the year 91 (93) new members joined the Society and we lost 55 (65) by the reason of death, resignation and the operation of Rule 29. The total membership at the end of the year was 1316 (1280) with a net gain of 36 (28). We record with great regret the death of a valued and honorary member, Dr. W. B. Turrill, who joined the Society over fifty years ago. We lost also a member of long association with us in Mrs. C. I. Sandwith.

The accounts for the year, which are appended to this report, show a reasonably satisfactory position. There has been a modest increase in the amounts of subscriptions and of interest received, which are partly offset by a decrease in the proceeds from the sale of periodicals and old Botanical Exchange Club Reports.

Provision has been made for the full cost of printing and distributing two parts each of *Proceedings* and *Watsonia* and for the printing work already in hand on the next succeeding parts. In addition, there has been charged against the General Income and Expenditure Account an amount of approximately £116 for the cost of making photographic copies of a number of earlier parts of B.E.C. Reports, in order that we can offer for sale a few complete sets of these Reports. It is anticipated that this expenditure will be more than recovered by the sale of sets of these Reports in succeeding years.

The Publications Fund has borne the cost of printing the latest Conference Report, but it may be anticipated that this cost will be recovered in due course, as there is always a steady demand for Conference Reports.

It will be noted that the funds of the Society have benefited by a legacy of £100 from a former President, the Rt. Hon. H. T. Baker.

The cost of all our activities tends to increase year by year and in particular this is true of the cost of printing the Society's publications. It is, therefore, essential that the membership should be increased if our activities are to be extended and improved.

Mr. J. H. G. Peterken, who has been our Honorary Auditor for many years, has asked to be relieved of his responsibilities We are most grateful to him for his long services in this thankless task. Messrs. Price, Waterhouse & Co., the well-known professional accountants, have kindly offered to undertake the work on an honorary basis.

Most of the work of the **Maps Committee** (Secretary, Professor A. R. Clapham) has been concerned with the publication of the *Atlas of the British Flora* and with negotiations regarding the continued use of the recording unit when the Distribution Maps Scheme has passed through its second phase. We record once more our gratitude to the Nature Conservancy for meeting such a large proportion of the cost of the

Scheme and to Cambridge University for providing accommodation for the staff and equipment. The progress of the Scheme itself is the subject of a separate report by the Director.

Meetings arranged by the **Meetings Committee** (Secretary, Dr. H. J. M. Bowen) were of a varied nature. On the day of the Annual General Meeting at Oxford, lectures were given by Dr. E. F. Warburg and Dr. S. R. J. Woodell and a visit was made by members to the Oxford Botanic and Genetic Gardens. A sherry party held in the evening in the Senior Common Room of Magdalen College was well attended and on the following day a number of members visited places of botanical interest in the Evenlode Valley.

A Regional Meeting held at Leicester and organised by Mr. E. K. Horwood was most successful and in connection with this history was made for the Society by the holding of a dinner party. On the following day a visit was made by members to sites in Huntingdonshire. Our thanks are given to Professor T. G. Tutin for the hospitality provided.

The subject of a Conference, held in London in the Rooms of the Linnean Society, was Local Floras and this attracted a large attendance of members of the Society who are actively engaged in the study of the plants of restricted areas. A report of this most successful meeting is being prepared by Mr. P. J. Wanstall. During the period of the Conference, history was again made for the Society by the innovation of a President's Reception. After the Conference, the Annual Exhibition Meeting produced 41 (31) exhibits, a number of which were related to the theme of the Conference.

Field meetings, which were arranged by the Field Secretary (P. C. Hall), attracted a total attendance of 196 (144). The attendance at individual meetings is shown in brackets: Colchester (27); Dropmore. for the study of grasses (51); Preston Montford (7); Staffordshire, for the study of brambles (23); Brantwood (23); alien hunt (63). We report, with much regret, that a meeting arranged to take place in Denmark, was cancelled through lack of support. The varied attendance at field meetings is receiving the attention of the Council and the various committees concerned.

The meetings arranged by the **Junior Activities Committee** (Secretary, P. F. Hunt) were also varied in attendance. A visit to the Department of Botany, British Museum (Natural History) attracted 30, and the two residential meetings at Arnside and Silverdale and at Brantwood (coinciding with the meeting for older members) were attended by 21 and 3 respectively. The attendance at the day meetings is shown in brackets: Cassop Vale (70); Wendover (6); Surlingham (27); Selborne (14); Hebden Bridge (13). We thank our previous secretary, Dr. Margaret E. Bradshaw, for having completed the arrangements for these meetings, and the various leaders and other helpers who have assisted in this most useful branch of the Society's work. On behalf of the Committee, Dr. C. T. Prime has prepared a useful report on the extent to which field work is taken into consideration by the various schools' examination syndicates.

During the year Dr. C. D. Pigott resigned as secretary of the **Conservation Committee** and his place was taken by Dr. D. H. Dalby.

We thank Dr. Pigott for his valuable service during a period of four years in this very important branch of our work. At liaison meetings with the Nature Conservancy we brought to the notice of the Conservancy a number of questions, including the need to have registration of transplant experiments and to control the introduction of native species to Nature Reserves, the desirability of conserving some lengths of canals and the increased threats by roadside spraying. Specific cases in which the Committee has acted or its advice has been sought include threats to Braunton Burrows, Morfa Harlech, Lakenheath Poor's Fen, Berry Head, Mickfield Meadow (Suffolk) and the Buckinghamshire station of *Orchis militaris*. The Committee secured the assurance that an advertisement in a gardening paper asking for wild plants will not re-appear. The Committee has also considered the need to have a confidential record of the stations of our rarest native plants and the extent to which the Society can support or formulate a policy for the better protection of wild flowers.

During the year two parts of *Proceedings* and three parts of *Watsonia* have been published and *A Darwin Centenary* (a report of the Conference held in 1959), edited by P. J. Wanstall, has also appeared. In addition to assisting the editors of these publications the **Publications Committee** (Secretary, P. J. Wanstall) has considered the need for a new *Comital Flora*. The sales of our periodical and other publications have continued to be good but not as high as in recent years. Again we express our thanks to E. B. Bangerter for his services in handling the sales of our publications and to the Trustees of the British Museum (Natural History) for continuing to allow the storage of these publications at the Museum.

The **Development and Rules Committee** (Secretary, A. C. Jermy) has made a complete revision of the Panel of Specialists and List of Recorders. The Committee has also spent much time in producing a new Prospectus which in the coming year will replace the one which has been in use for the past twelve years. It has also considered the best means by which the various documents relating to the work of the Society may be preserved and ways in which the educational aspects of the Society's work could be organised.

The **Committee for the Study of the Scottish Flora** (Secretary, B. W. Ribbons) arranged a full programme which included three Exhibition Meetings held at Dunfermline, Kirkcaldy, and Edinburgh. The venues of field meetings, the main object of which was to supplement records made for the Maps Scheme, were Stirlingshire (5), the Isle of Arran (4), Mull (9), Selkirkshire (5), Stob Garbh (c. 40), Glen Almond (5), Easdale and the Garvellachs (5). Attendances at these various meetings are shown in brackets and a further account of them, and other work of the Committee will appear in a later number of *Proceedings*.

The Council again thanks the many members and friends who have helped the Society in various ways to continue its work.

J. E. LOUSLEY, President.
J. G. DONY, Secretary.

February 9th, 1962.

GENERAL INCOME AND EXPENDITURE ACCOUNT

for the year ended 31st December 1961

1960			
	Cost of Printing and Distributing:		
	Proceedings, Vol. IV, Part 3, and provision for Work in progress on Part 4 (less over-provision from 1960)	£527 1 6	
	Watsonia, Vol. V, Parts 1 and 2, and provision for Work in progress on Part 3 (less over-provision from 1960)	915 8 4	
	Reprinting certain back numbers of B.E.C. Reports ...	116 12 3	
£1,513			£1,559 2 1
50	Grant to Maps Scheme ...		50 0 0
120	Printing Notices of Meetings		120 14 7
52	Expenses of Council and Committee Meetings ...		62 11 5
178	General printing, stationery, postages, telephone and petty expenses		176 12 7
6	Field and Exhibition Meetings, expenses less fees received		19 0 11
310	Excess of income over expenditure credited to General Fund		256 9 5
£2,229			£2,244 11 0

1960			
£1,795	Subscriptions received		£1,843 4 6
154	Interest received		199 6 2
	Proceeds from Sales:		
	Proceedings ...	£33 1 1	
	Watsonia ...	120 5 11	
	Old B.E.C. Reports ...	48 13 4	
280			202 0 4
£2,229			£2,244 11 0

PUBLICATIONS FUND

Transactions in 1961

1960		
	Cost of printing and binding *A Darwin Centenary* ...	£382 13 10
£7	Prospectuses and publicity ...	8 12 0
1,887	Balance to 1962	1,650 18 8
£1,894		£2,042 4 6

1960			
£1,787	Balance from 1960		£1,887 9 2
	Sales:		
4	*Flora of Jersey*	£5 8 8	
12	*British Herbaria* ...	4 19 2	
26	*List of British Vascular Plants* (half share) ...	22 7 7	
—	*A Darwin Centenary* ...	80 3 7	
50	Other Conference Reports	31 6 4	
15	Other Publications	10 10 0	
			154 15 4
£1,894			£2,042 4 6

BALANCE SHEET as at 31st December 1961

196	General Fund :		
	Balance 1st January 1961 ...	£1,380 10 4	
	Legacy received from estate of the Rt. Hon. H. T. Baker (dec.)	100 0 0	
	Add : Excess of income over expenditure for year	256 9 5	
£1,381			£1,736 19 9
1,887	Publications Fund		1,650 18 8
40	Benevolent Fund		39 11 0
750	Creditors for Printing and General Expenses		1,328 4 1
105	Subscriptions Received in Advance		102 11 0
£4,163			£4,858 4 6

1960	Investments :		
	4½% Defence Bonds	£500 0 0	
	5% Defence Bonds	2,000 0 0	
£1,500			£2,500 0
	Cash at Bank :		
	Deposit Account .	£2,000 0 0	
	Current Account .	358 4 6	
2,663			2,358 4
£4,163			£4,858 4

Examined and found correct.
January 31st, 1962.

J. H. PETERKEN, Hon. Auditor.
J. C. GARDINER, Hon. Treasurer.

DISTRIBUTION MAPS SCHEME

EIGHTH ANNUAL REPORT TO 31st DECEMBER 1961

During 1961 the greater part of our time was devoted to preparing the material for the *Atlas of the British Flora.* The last maps were finished and delivered to the printers on 19th December. Before the end of the year the Introduction and the Appendices had also been completed. The Index is being prepared and will be sent off as soon as we have the text of the Atlas in page proof. The printers are confident that the volume will be ready for distribution by the end of April.

A limited number of field records were made during the year and some very useful work was done during the Whitsun meeting at Colchester and, by a small but enthusiastic party under Mr. C. Sinker's guidance, in Shropshire and neighbouring Welsh counties. A number of meetings arranged by the Committee for Study of the Scottish Flora made a valuable contribution.

A 'Critical Groups' circular was sent out in March and has produced some helpful records, though a better response will have to be made in the next two years if we are to have satisfactory maps for the Critical Supplement.

The Species Sub-Committee met during the year and drew up a list of species, subspecies and hybrids which it thought should be mapped. As a guide to future work, a pamphlet is being prepared for circulation in the spring, listing the species we are interested in and giving taxonomic help in many cases. Only data collected in 1962 and 1963 can be included in the Supplement. Thanks to the continued support of the Nature Conservancy the scheme will continue until 31st March 1964, but its work must be completed by that date.

In July, Miss Nicholson resigned her position as Secretary to the Director, but we were fortunate to be able to welcome in her place Miss A. Hughes. To these and to Mrs. Fincham (still happily punching the endless cards) my warmest thanks are due. I would also like to make special mention of the assistance given by Dr. S. M. Walters in preparing the Introduction and in checking the maps: this has been no small task. Dr. C. D. Pigott also has given invaluable help by inspecting all the maps. To both of them I am deeply indebted.

F. H. PERRING.

DISTRIBUTION ATLAS ACCOUNT

for the year ended 31st December 1961

960			
	To Balance from 1960 :		
	Current Account	£288 10 3	
	Deposit Account	500 0 0	
£869			£788 10 3
3,135	,, Grant from Nature Conservancy		3,196 0 0
50	,, Grant from B.S.B.I. ...		50 0 0
29	,, Interest Received		41 16 8
26	,, Sales of Record Cards and Maps		54 4 8
4,109			£4,130 11 7

1960			
£3	By Furniture and Office Equipment		£42 9 0
	,, Mechanisation Equipment :		
	Rental Charges and Maintenance	£532 1 0	
	Stationery ...	67 17 4	
603			599 18 4
64	,, Postages and Telephones		62 6 10
92	,, Printing and Stationery ...		89 16 9
2,478	,, Salaries, Wages and Clerical Assistance ...		2,657 17 0
50	,, Staff Travelling Expenses		44 10 11
15	,, Insurance		15 10 9
1	,, Repairs		4 0 4
15	,, Other Expenses		5 1 6
	,, Balance to 1962 (being total funds in hand) :		
	Current Account	£109 0 2	
	Deposit Account	500 0 0	
788			£609 0 2
£4,109			£4,130 11 7

Examined and found correct.
January 31st, 1962.

J. H. PETERKEN, Hon. Auditor.
J. C. GARDINER, Hon. Treasurer.

COMMITTEE FOR THE STUDY OF THE SCOTTISH FLORA

SEVENTH ANNUAL REPORT TO 31st DECEMBER 1961

The Committee has met three times (at Kirkcaldy in March, at Perth in October, and at Edinburgh in November), has held three Exhibition Meetings (at Dunfermline on 17 March, at The Museum, Kirkcaldy, by kind permission of the Town Clerk, on 18 March, and at the Royal Botanic Garden, Edinburgh, by kind permission of the Regius Keeper and the Regius Professor, on 11 November), and has arranged eight Field Meetings (Stirling, 27 May, led by Miss E. P. Beattie (5); Kilmory, Arran, 3-10 June, led by Miss U. K. Duncan (4); Stob Garbh, 17 June, led by the Meetings Secretary, the Chairman, and Mr. J. Grant Roger (*c.* 40); Glen Almond, 30 June-2 July, led by Dr. Derek A. Ratcliffe (5); Easdale and the Garvellachs, 1-8 July, led by Miss C. W. Muirhead (5); Mull, 8-15 July, led by the Meetings Secretary (9); Galashiels, 22-23 July, led by Miss E. P. Beattie (5); and at Garth Field Centre (Cryptogamic Foray), 30 September-2 October, led by Mr. D. M. Henderson (12). The figures in brackets indicate the number of members and friends present at each field meeting. Reports of the field meetings will appear in a later number of the *Proceedings of the B.S.B.I.*

The Exhibition Meeting at Dunfermline was attended by about 30 persons. Miss E. P. Beattie gave a talk on the natural and introduced Plants of Fife and the following exhibits were shewn: the B.S.B.I. and B.S.E. official exhibits; New records from Shetland (R. Palmer); British *Equiseta* (Miss U. K. Duncan); Aliens of Fife and the Lothians (Miss E. P. Beattie); Genetical aspects of germination in *Rubus*, and Variation in the tomato in Scotland (G. Haskell); A method of mounting mosses (Glasgow Botanic Gardens, per G. Rodway); Plants from the Kishorn limestone (A. A. P. Slack); and Distribution Maps shewing plants absent or infrequent in Ireland (F. H. Perring, B.S.B.I. Maps Scheme). The Chairman thanked the Dunfermline Naturalists' Society for help with the arrangements and for the tea provided.

In Kirkcaldy some 50 people saw the Exhibits which were the same as at Dunfermline. Miss Beattie again spoke on the natural and introduced plants of Fife and about 25 people attended. The Chairman thanked the Town Clerk for permission to use the Museum, and the Curator of the Museum, Mr. W. Wood, and the Kirkcaldy Naturalists' Society for help with the arrangements.

In Edinburgh the attendance was about 50. The following shewed colour transparencies taken at 1961 Field Meetings: Dr. Derek Ratcliffe, Dr. Denis Ratcliffe and Mr. A. Stirling. Miss E. P. Beattie shewed photographs of interesting plants recently seen in the Edinburgh area. The following exhibits were shewn: "Leaves from a lost herbarium". The herbarium of Professor Hennedy was lost from sight at his death: it was discovered by chance in 1953, when it was established that it had been used by Scott-Elliot during 1896-1910, and not since. His herbarium was the foundation of his *Clydesdale Flora*, which was the definitive regional flora from 1865 to 1933 when Lee published *Flora of the Clyde Area*. Some sheets of interest were shewn, including the now extinct *Urtica pilulifera*. "Relics of the Scottish Cryptogamic Society"—photograph of some members on a foray in 1923 and a menu of a dinner of fungi, Perth, 1875 (Dr. B. Lloyd); The genus *Lathyrus* and *Polypodium* varieties (Miss U.K. Duncan); Plants from Mull (A. Stirling); Flora of the Caenlochan Nature Reserve (J. Grant Roger); Recent plant discoveries in the west of Scotland and plants of basic outcrops in the Highlands and in Kintyre (A. A. P. Slack); Some Sutherland plants (J. Anthony); Oaks in Scotland (J. Cousins); Plants of Easdale and the Garvellachs (Miss C. W. Muirhead); *Spergularia* species and hybrids (J. Ratter); *Ledum groenlandicum* from Callander (B. W. Ribbons); *Kalmia polifolia* from the Upper Forth valley (G. D. Scott); Coastal plants from Arran and Colonsay (E. C. D. Todd); British Boleti (R. Watling); *Misopates orontium* and *Orobanche minor* from Kirkcaldy (G. H. Ballantyne); Bryophytes of the west of Scotland (G. Rodway); and the B.S.B.I. and B.S.E. official exhibits.

At the end of 1960 Mr. P. S. Green left for the U.S.A. and in his place the B.S.E. appointed Dr. D. H. N. Spence. Mr. Green gave valuable service to the Committee both during his term of membership and also for a number of years previously when he was Honorary Secretary of the Botanical Society of Edinburgh. Mr. R. Mackechnie was re-elected a member of the Committee and re-appointed Chairman. Mr. B W. Ribbons was re-appointed Honorary Secretary, Mrs. F. M. Elder, Field Secretary, and Dr. Denis Ratcliffe was co-opted for a further year and re-appointed Meetings Secretary.

The accounts shewed a deficit of £17 9s. 0½d. for the year 1960 and this amount has been refunded by the two Societies.

The Committee regretfully decided that, for a time at least, no further provincial Exhibition Meetings should be held unless requested by local botanists or a natural history society. The Committee once again suggested to the B.S.B.I. Council that in view of the difficulty of finding a member at once resident in Scotland and able to attend all Council meetings in London, it should be possible for Scottish members of Council to be represented by a deputy on some occasions.

Once again it is a pleasure to express grateful thanks to the officers of the two Societies and to all those who have given freely of their time and energy to make possible the various activities arranged by the Committee.—B. W. RIBBONS.

SUMMARIES OF PAPERS READ PRIOR TO THE ANNUAL GENERAL MEETING, 1962

THE NORTHERN LIMITS OF TREES

A. R. Clapham

Professor Clapham illustrated his talk with examples from Britain and Finland. Several species, e.g *Fagus sylvatica* in Britain and *Picea abies* in Finland, are extending their range northwards and westwards at the present time, though the northern range of *Fagus sylvatica* in Britain may never have been so restricted as Tansley suggests. On the other hand, *Pinus sylvestris* is retreating southwards in Finland, which may reflect recent changes in forest usage there.

A few native trees, notably *Tilia cordata*, must be regarded as relicts as they have lost their capacity to reproduce by seed in Finland and probably in Britain. Further information on the viability of seed from trees in different parts of Britain would be useful.

ASSEMBLING THE MAPS SCHEME DATA

S. M. Walters

Dr. Walters reviewed the genesis of the Distribution Maps Scheme and made the modest claim that the mechanical handling of the data was the only outstanding innovation conceived during the project. The idea of an Atlas of distribution maps was fully developed by Watson a century ago, but two factors had been of vital importance in its practical production. One was the technique of punched-card recording, and the device by which maps could be printed directly from a stack of punched cards. The other was the enthusiastic manner in which at least 1500 helpers had sent in records from many parts of the country, so that only seven grid squares in the British Isles were not covered by the survey.

ASSESSING THE MAPS SCHEME DATA

F. H. Perring

Dr. Perring outlined the pitfalls involved in attempting to interpret the many types of distribution displayed in the new maps. In some instances a single factor, such as altitude, temperature or rainfall, was the predominating one, but in other cases, such as *Primula elatior*, two independent climatic factors appear to limit the distribution.

The maps show clearly where plants are becoming rare (e.g. the northward retreat of *Pyrola media* and *Parnassia palustris*), but generally fail to indicate where plants have recently spread.

H. J. M. Bowen.

ANNUAL GENERAL MEETING, 28th APRIL 1962

The Annual General Meeting of members of the Society was held in the rooms of the Linnean Society, Piccadilly, London, W.1, on Saturday, 28th April 1962, at 12 noon.

The President (Mr. J. E. Lousley) was in the Chair, and 96 members were present.

The Minutes of the last Annual General Meeting, as printed in *Proceedings*, Vol. 4, Part 3, pages 347-349, were adopted.

COUNCIL'S REPORT.—The Report of the Council for the year 1961 had been printed and circulated to all members. The President drew special attention to the imminent publication of the "Atlas of the British Flora", which had been promised at the last Annual General Meeting. The finances of the Society were in a healthy condition.

The President, on behalf of the members, thanked the General Secretary, Treasurer and other officers for all they had done during the year.

The adoption of the Reports and Accounts was carried unanimously.

CHANGE OF RULES.—The President said that two changes of Rules were proposed by the Council. In Rule 19 the wording "Panel of Specialists" to become "Panel of Specialists and Referees". This would bring the Society more into line with kindred Societies. Council recommended further that Rule 24 should be changed to read "Candidates for membership shall sign a Form of Declaration of their willingness to support the objects of the Society and accept the responsibilities of membership. The Council reserves the right to refuse the admission of a candidate to membership". If this change were adopted new members would no longer have to find proposers and seconders and a new brochure could be used more effectively. The adoption of this change was proposed by Dr. C. T. Prime and seconded by Dr. M. E. Bradshaw and carried.

ELECTION OF THREE VICE-PRESIDENTS, HONORARY OFFICERS: GENERAL SECRETARY, TREASURER, TWO EDITORS, MEETINGS SECRETARY, FIELD SECRETARY, and JUNIOR ACTIVITIES SECRETARY.—Council had nominated Miss C. M. Rob and Dr. E. F. Warburg (for re-election) and Dr. S. M. Walters, Dr. J. G. Dony, Mr. J. C. Gardiner, Mr. D. H. Kent and Dr. M. C. F. Proctor, Dr. H. J. M. Bowen, Mr. P. C. Hall and Mr. P. F. Hunt respectively, and they were elected unanimously and thanked for their past services.

ELECTION OF MEMBERS OF COUNCIL.—Mr. E. B. Bangerter, Mr. A. C. Jermy, Mr. D. McClintock retired in accordance with the old Rules and, in accordance with the Rules adopted in 1960, three members were to be elected. A further vacancy arose from the election of Dr. S. M. Walters as a Vice-President. Four members had been nominated and were elected. The President drew lots to determine the seniority of the members so elected, which is as follows: Mr. D. E. Allen, Mrs. A. H. Sommerville, Dr. D. H. Dalby and Mr. E. Milne-Redhead. The President expressed thanks to the retiring members for their work for the Society.

ELECTION OF HONORARY MEMBERS.—Council had nominated Professor A. R. Clapham and Mr. A. E. Wade. The President said that the Society was greatly indebted to Professor Clapham for his service as Secretary to the Maps Committee since its inception in 1950. The "Atlas" which members had seen for the first time that day was the result of the work of that committee and owed a great deal to the enthusiasm of Professor Clapham. Mr. Wade had recently retired after long service in the Botany Department of the National Museum of Wales and much of the progress made in the study of Welsh botany during this period was due to Mr. Wade's work. Both Professor Clapham and Mr. Wade were elected unanimously as Honorary Members.

ELECTION OF AN HONORARY AUDITOR.—Mr. J. H. G. Peterken, who had been Honorary Auditor for many years, had expressed a wish to be relieved of this work. Messrs. Price, Waterhouse and Co., the well-known firm of professional accountants, having kindly offered to undertake the work on an honorary basis, were duly elected. A resolution that Mr. Peterken be thanked for his long and valuable services was carried unanimously.

There being no further business, the President declared the meeting closed at 12.25 p.m.

J. G. D.
B. W.

At the conclusion of the Annual General Meeting a meeting of members normally resident in the South East Region was held. The President (Mr. J. E. Lousley) was elected to the Chair and 47 members were present.

Two members had been nominated to represent the Region on Council. A ballot was held and Mrs. B. H. S. Russell was declared elected.

J. G. D.
B. W.

On Sunday, April 29th, there was an excursion to Wisley, Surrey, attended by 27 members. Bolder Mere was visited and *Ranunculus omiophyllus* (*R. lenormandii*) was seen in flower; *Calla palustris*, which has been naturalised here for 90 years, was only just unfolding its leaves. After lunch near the Hut Hotel, Newark Abbey was visited, but no trace of *Holosteum umbellatum* was visible. The plant was apparently last seen in 1933, since when the fields round the Abbey have been ploughed and the small fragments of suitable wall mostly overgrown. *Stellaria pallida* and *Sisymbrium orientale* were flowering on the ruins.

Afterwards members visited the Royal Horticultural Society's gardens at Wisley. Interesting plants which are fully naturalised here included *Narcissus bulbocodium*, *Lathyrus niger*, *Actaea spicata*, *Gagea lutea*, *Lysichiton americanus* and *Aponogeton distachyum*. *Montia alsinoides*, *M. perfoliata*, *Digitaria ischaemum* and a form of *Oxalis acetosella* with deep-pink flowers were unusual members of the weed flora. The Alpine house was particularly admired, and among the plants displayed in flower were European specimens of *Aceras anthropophorum* and *Orchis simia*.

H. J. M. Bowen.

DINNER TO CELEBRATE THE PUBLICATION OF THE "ATLAS OF THE BRITISH FLORA"

On the evening of April 28th, 1962, a dinner was held at Crosby Hall, Chelsea, S.W.3, to celebrate the publication of the *Atlas*. 64 members were present, together with the following guests: Lord Hurcomb and E. M. Nicholson (Nature Conservancy); Sir Gavin de Beer, Professor T. M. Harris (Linnean Society); Professor A. R. Clapham (Secretary, Distribution Maps Committee); J. E. Dandy (British Museum (Natural History)); J. Owen (Nuffield Foundation); L. Murby (Thomas Nelson & Sons Ltd.); J. Redgrave (Jarrold & Sons Ltd., Printers); Miss M. Matthews (ex-Secretary to the Director, Distribution Maps Scheme); Miss C. M. Rob, a Vice-President, represented the Wild Flower Society.

At the conclusion of the dinner, Professor Harris proposed the toast of the Society and said he hoped the officers would have a new project ready for members soon, as it would be some time before the next glaciation wiped the squares clean for a new edition of the *Atlas*. In reply, the President praised the efforts of those who had sent in records for the scheme, for by doing so they had very considerably reduced the cost of collecting the data. Referring to the *Atlas*, he said that "an egg of that size could not be laid without imposing a considerable strain on the hen".

Professor Clapham then proposed the health of the guests, and combined a historical resumé of the workings of the Maps committee with a review of the contribution each guest had made to the publication of the *Atlas*. In reply, Lord Hurcomb said that although the Nature Conservancy had spent £25,000 financing the work they felt they now had good value for money. He hoped the *Atlas* would act as a stimulus to prevent the loss of treasured natural resources, and encourage the Society to make strong representations when important localities were threatened with "development".

In proposing the toast to the *Atlas*, Mr. Nicholson regretted that his knowledge of botany was limited to the area of Chelsea. He felt that the Society had made a great leap forward by producing the *Atlas*, more especially as it was delivered only three hours late! Ornithologists, he felt, had been put to shame by the botanists, and other Societies would soon have to follow the lead given by the B.S.B.I. In reply, Dr. Walters said that although he hardly remembered doing so, he proposed the Maps Scheme at a conference in 1950: three years later he was surprised to be appointed Director of the scheme. He paid tribute to his successor, Dr. Perring, and to the extraordinary capacity of co-operation between field naturalists who had helped in the scheme. Dr. Perring then referred to the most important factor in the scheme—the "Max" Factor. He also paid tribute to the many helpers in the scheme, to the timely appearance of *The Flora of the British Isles*, in 1952, and to his wife and Mrs. Walters.

The dinner concluded at 10.45 p.m.

H. J. M. Bowen.

ASSISTANT SECRETARY'S REPORT FOR 1961

During 1961, 91 new members joined the Society, this being 2 less than in 1960, and 19 less than in 1959. Of the new members 56 were Ordinary members, 10 Subscriber members, 23 Junior members and 2 Family members.

Losses were 55, this being 10 less than in 1960, and 103 less than in 1959. Of these 29 members resigned, 20 ceased to be members under the operation of Rule 29, and we deeply regret having to record the deaths of the following 6 members:—A. A. Brooke, Rev. D. M. Heath, J. McK. Moon, Mrs. C. Sandwith, Miss M. S. Shaw, and Dr. W. B. Turrill.

New Ordinary members are:—Miss J. M. Allison, Miss J. M. Beadon, Mrs. A. Bennett, M. J. Benton, Lady Anne Brewis, K. M. Brown, P. D. Coker, Dr. T. S. Cooperrider, Flt.-Lt. C. P. J. Coulcher, G. B. Evans, L. L. Evans, A. J. Farmer, I. K. Ferguson, Miss D. A. Gardiner, Dr. F. M. Hall, Dr. G. F. C. Hawkins, P. R. Helm, J. H. Hemsley (rejoined), J. C. Henly, Miss A. Higginbottom, J. E. Houldin, D. R. Hunt, Miss P. M. Hutchison, G. E. S. Kendall, J. E. Kirby, J. C. Kitchen, E. R. B. Little, Miss J. McClure, Mrs. W. Marsh, J. N. Mead, A. E. Moon, L. E. Newton, Miss E. D. Overend, G. S. Phillips, Miss A. E. Ratcliffe, Miss R. Rawlinson, Lady Ricketts, M. J. Ricketts, J. I. Robbins, Mrs. K. D. Rowlands, Dr. B. Seddon, Miss S. Shepherd, P. J. Shipton, R. E. Shorrocks, Miss S. A. D. Simons, Miss A. Sleep, A. R. Smith, Miss N. H. Smith, Cdr. R. Dudley-Smith, Miss U. K. Smith, F. A. Sowter (rejoined), Mrs. D. C. Thomas, Miss G. Tuck, F. R. Vane, Mrs. P. E. Webb, and B. Young.

New Junior Members are:—Miss C. M. Bevan, I. R. Bonner, Miss L. F. Bowden, Miss M. E. Brown, A. Doig, Miss D. Earl, Miss J. Farrell, P. Grant, A. J. Gray, J. F. Harper, Miss C. M. Hopkinson, R. J. Littleton, D. M. Keith-Lucas, Miss L. Matthews, J. F. Nichols, P. J. Phelp (rejoined), B. Sheen, A. Russell-Smith, E. Teague, Miss L. Tyson, Miss J. West, P. T. S. Whiteman, and J. R. I. Wood.

New Subscriber members are:—State Herbarium, Adelaide; The Banffshire Society; Dorchester County Library; Loughborough Naturalists' Club; Meerut College, India; Istituto Botanico dell' Universita, Milano; Dept. of Botany, University of St. Andrews; University College of Rhodesia and Nyasaland, Salisbury; Unilever Research Laboratory Natural History Society, Sharnbrook, and Wakefield Girls' High School.

New Family members are:—Mrs. L. L. Evans and Mrs. P. E. L. Hawkins.

D. H. Kent.

January 1962.

FUNCTIONS OF DISTRICT SECRETARIES AND RECORDERS

DISTRICT SECRETARIES

1. To keep in touch with members within their District and as far as possible *to arrange meetings for their benefit.*

2. To promote the enrolment of new members within their District.

3. To answer enquiries from members on travel facilities, accommodation, access to private property, and similar matters of a local nature. (This does not include supplying information about localities for rare plants).

4. To keep in touch with all local institutions with a botanical connection and, as far as possible, to develop botanical interest in the District by working through one or more of the local natural history societies.

5. To assist the Hon. Meetings Secretary, Hon. Field Secretary and leaders of field meetings in connection with any meetings of the Society in their District.

6. To make regular visits, as far as possible, to habitats of special interest within their District and report without delay to the Hon. Secretary of the Conservation Committee any threat which may call for conservation measures.

RECORDERS

1. To promote work on, and to answer queries from members about the flora of their areas. (This does not include supplying information about localities for rare plants.)

2. To assist the Hon. Editors by collecting and sending in records of more than local interest and by checking records contributed for publication; also to keep a permanent catalogue or index of all noteworthy additions to such standard Floras of their areas as may have been published.

3. To forward to the appropriate quarter information about important changes in the flora of their areas.

4. To check and help collect records on behalf of the Distribution Maps Scheme for the grid-squares in their areas.

LIST OF DISTRICT SECRETARIES AND RECORDERS

(revised November 1961)

The members listed below have agreed to act in the capacities mentioned for the Watsonian vice-counties in question. All addresses (except where given) can be obtained from the List of Members (see *Proceedings, B.S.B.I.*, vol. 3, pt. 4 (1960)).

REGIONS	DISTRICTS	VICE-COUNTIES	RECORDER
SOUTH WEST	*Peninsula* District Secy.: Dr. R. B. Ivimey-Cooke	0. Channel Is.	D. McClintock
		1. W. Cornwall	R. W. David
		1b. Isles of Scilly	J. E. Lousley
		2. E. Cornwall	R. W. David
		3. S. Devon	Miss M. A. Turner
		4. N. Devon	Miss M. A. Turner
	Avon District Secy.: Dr. L. C. Frost	5. S. Somerset	A. D. Hallam
		6. N. Somerset	N. Y. Sandwith
		7. N. Wilts.	J. D. Grose
		8. S. Wilts.	J. D. Grose
		33. E. Gloucester	Miss D. E. de Vesian
		34. W. Gloucester	Miss D. E. de Vesian
	Channel District Secy.: W. M. M. Baron	9. Dorset	Dr. H. J. M. Bowen
		10. Isle of Wight	A. W. Westrup
		11. S. Hants	A. W. Westrup
		12. N. Hants	A. W. Westrup
SOUTH EAST	*Home Counties—S.* District Secy.: Dr. D. P. Young	13. W. Sussex	E. C. Wallace
		14. E. Sussex	D. Philcox
		15. E. Kent	Dr. F. Rose
		16. W. Kent	Dr. F. Rose
		17. Surrey	Mrs. B. Welch
	Home Counties—N. District Secy.: S. T. Jermyn	18. S. Essex	S. T. Jermyn and B. T. Ward
		19. N. Essex	S. T. Jermyn and B. T. Ward
		20. Herts.	Dr. J. G. Dony
		21. Middlesex	D. H. Kent
		30. Bedford	Dr. J. G. Dony
	Thames District Secy.: Miss M. B. Hyde	22. Berks.	Dr. E. F. Warburg
		23. Oxford	Dr. E. F. Warburg
		24. Bucks.	Miss M. B. Hyde
	Anglia District Secy.: Miss R. M. Barnes	25. E. Suffolk	F. W. Simpson
		26. W. Suffolk	F. W. Simpson
		27. E. Norfolk	E. A. Ellis
		28. W. Norfolk	E. L. Swann
		29. Cambridge	Dr. F. H. Perring
		31. Hunts.	J. L. Gilbert
MIDLANDS	*Severn* District Secy.: J. A. Kiernan	36. Hereford	Mrs. L. E. Whitehead
		37. Worcester	F. Fincher
		38. Warwick	R. C. Readett
		39. Stafford	E. S. Edees
		40. Salop	C. A. Sinker
	Trent District Secy.: R. C. L. Howitt	32. Northants.	H. G. Allen [Ivydale, Wootton, Northampton.]
		53. S. Lincoln	Miss E. J. Gibbons
		54. N. Lincoln	Miss E. J. Gibbons
		55. Leicester	Prof. T. G. Tutin
		56. Nottingham	R. C. L. Howitt
		57. Derby	Miss K. M. Hollick

REGIONS	DISTRICTS	VICE-COUNTIES	RECORDER
Wales	*S. Wales* District Secy.: Mrs. H. R. H. Vaughan	35. Monmouth	Dr. B. Seddon
		41. Glamorgan	Dr. B. Seddon
		42. Brecon	Dr. B. Seddon
		43. Radnor	Dr. B. Seddon
		44. Carmarthen	Mrs. H. R. H. Vaughan
		45. Pembroke	T. A. W. Davis
		46. Cardigan	P. M. Benoit
	N. Wales District Secy.: P. M. Benoit	47. Montgomery	C. A. Sinker
		48. Merioneth	P. M. Benoit
		49. Caernarvon	Dr. B. Seddon
		50. Denbigh	Dr. B. Seddon
		51. Flint	Dr. B. Seddon
		52. Anglesey	Dr. B. Seddon
North	*Mersey* District Secy.: Miss V. Gordon	58. Chester	Mrs. M. W. Cullen
		59. S. Lancaster	Miss V. Gordon
		60. W. Lancaster	Miss J. D. Williamson
		71. Isle of Man	D. E. Allen
	Yorkshire District Secy.: Miss C. M. Rob	61. S.-E. York.	Dr. W. A. Sledge
		62. N.-E. York.	Miss C. M. Rob
		63. S.-W. York.	Dr. W. A. Sledge
		64. Mid-W. York.	Dr. W. A. Sledge
		65. N.-W. York.	Miss C. M. Rob
	Tyne District Secy.: Dr. M. E. Bradshaw	66. Durham	Prof. D. H. Valentine
		67. Northumberland, S.	Dr. G. A. Swan
		68. Cheviotland	Dr. G. A. Swan
	Lakes District Secy.: Rev. Canon G. A. K. Hervey	69. Westmorland	Mrs. F. L. Woodman [Bankfield, Allithwaite, Grange-over-Sands.]
		70. Cumberland	Miss C. W. Muirhead
Scotland	Regional Secy.: Dr. Denis Ratcliffe	72. Dumfries	Dr. H. Milne-Redhead
		73. Kirkcudbright	Dr. H. Milne-Redhead
		74. Wigtown	Dr. H. Milne-Redhead
		75. Ayr	R. Mackechnie
		76. Renfrew	R. Mackechnie
		77. Lanark	R. Mackechnie
		78. Peebles	D. J. McCosh
		79. Selkirk	Dr. H. Milne-Redhead
		80. Roxburgh	Dr. H. Milne-Redhead
		81. Berwick	A. G. Long
		82. Haddington	Miss E. P. Beattie
		83. Edinburgh	Miss E. P. Beattie

REGIONS	DISTRICTS	VICE-COUNTIES	RECORDER
SCOTLAND		84. Linlithgow	Miss E. P. Beattie
		85. Fife	Miss C. W. Muirhead
		86. Stirling	B. W. Ribbons
		87. W. Perth	B. W. Ribbons
		88. Mid-Perth	A. W. Robson
		89. E. Perth	A. W. Robson
		90. Forfar	Sir George Taylor
		91. Kincardine	Mrs. A. H. Sommerville
		92 & 93. S. & N. Aberdeen.	Dr. C. H. Gimingham
		94. Banff	Miss M. McCallum Webster
		95. Elgin	Miss M. McCallum Webster
		96. Easterness	A. Slack
		96b. Nairn	Miss M. McCallum Webster
		97. Westerness	Dr. Derek Ratcliffe
		98. (Main) Argyll	Dr. K. N. G. McLeay
		99. Dunbarton	A. M. G. Stirling
		100. Clyde Isles	W. W. Fletcher [West of Scotland Agric. College, Glasgow, C.2]
		101. Kintyre	A. G. Kenneth
		102 & 103. S. & Mid-Ebudes	Miss C. W. Muirhead
		104. N. Ebudes	Dr. R. E. C. Ferreira
		105. W. Ross	Dr. D. M. Henderson
		106. E. Ross	Miss U. K. Duncan
		107. E. Sutherland	J. Anthony
		108. W. Sutherland	J. Anthony
		109. Caithness	Dr. R. E. C. Ferreira
		110. Outer Hebrides	Miss M. S. Campbell
		111. Orkney	I. C. Hedge [Royal Botanic Garden, Edinburgh, 3]
		112. Shetland	W. Scott
IRELAND	Regional Secy.: Miss M. P. H. Kertland	H 1 & 2, 6-12	Prof. D. A. Webb
		H 3	J. E. O'Donovan [Glandore, Co. Cork]
		H 4 & 5	Miss J. M. P. Scannell [Nat. Mus. of Ireland, Dublin]
		H 13	Miss E. M. Booth
		H 14-20, 22-28	Prof. D. A. Webb
		H 21	H. J. Hudson [The Bungalow, Hampstead, Dublin, 9]
		H 29-32, 34-40	Miss M. P. H. Kertland
		H 33	R. D. Meikle

PANEL OF REFEREES AND SPECIALISTS

Compiled by C. C. Townsend and P. F. Hunt (September, 1962)

Please read carefully before submitting specimens

In all instances it is understood that a complete plant (excluding root except in annuals and where specified) will be submitted together with any necessary notes on colour, habitat and locality (not for publication without sender's permission). For tall herbaceous plants the inflorescence and upper leaves, a short mid-section, and radical leaves, should be included, and when in doubt it is advisable to consult the referee beforehand as to the best methods of collection and preservation of material for subsequent determination. Where extensive hybridisation is known, or suspected to occur, samples should be sent showing the range of variation in the population. The abbreviations after the referees' names are of features and parts that are essential for accurate determination. If these are not sent the referee may refuse to determine the specimen.

Except where specified, pressed and dried material should be sent and a note enclosed as to whether the specimen can be retained by the referee or is to be returned to the sender. It should be remembered that critically named material is of greater value when located in large regional or national collections where it is available for consultation by future workers. If the specimen is to be returned, postage stamps must be included or return postage refunded on receipt.

The arrangement of the list is that of Dandy's "List of British Vascular Plants" (1958). It must be realised that the referee does not necessarily agree with the taxonomic or nomenclatorial treatment of his group in Dandy's List or in any other publication and that he may also qualify his identification with a query or "cf".

The referees' names in the List are given in alphabetical order when two or more are available for consultation. The addresses of most of the referees are to be found in the list of Members, but some referees are not members and some others do not want material sent to the address given in the list. In these instances the specimens should be sent to the referee c/o the institution specified.

Do not forget to enclose postage for reply

(preferably a stamped addressed envelope)

ABBREVIATIONS

bds. = buds
ckn. = catkins
cn. = colour notes (with dried material)
fl. = flowers
fre. = fresh material preferred
mfr. = mature fruit
ml. = mature leaves

r. = roots or underground parts
rl. = radical leaves
s. = seeds
sm. = spirit material
stsh. = sterile shoots
yfr. = young fruits
BM = Botany Department, British Museum (Nat. Hist.), London, S.W.7.
FRS = The Nature Conservancy, Furzebrook Research Station, Wareham, Dorset.
K = The Herbarium, Royal Botanic Gardens, Kew, Surrey.
NIAB = National Institute of Agricultural Botany, Huntingdon Road, Cambridge.
NMW = The Botany Department, National Museum of Wales, Cardiff.
UCD = Botany Department, University College, Dublin.
UCL = Botany Department, University College, London, W.C.1.

CRITICAL SYSTEMATIC GROUPS

Filices: J. A. Crabbe, mfr.
Isoetes: A. C. Jermy, mfr.
Equisetum: P. G. Taylor, r.
Dryopteris filix-mas agg: Mrs. P. J. Newbould (UCL).
Dryopteris dilatata-carthusiana (*spinulosa*) agg: Dr. S. Walker.
Polypodium: A. C. Jermy, mfr.
Ranunculus flammula: Mrs. P. Candlish, r.
Ranunculus hederaceus—R. baudotii: Dr. R. W. Butcher, Dr. C. D. K. Cook, mfr.
Thalictrum: Dr. R. W. Butcher, mfr., rl.
Fumaria: N. Y. Sandwith, mfr. (each gathering of fresh material packed in a separate bag as fr. and sepals deciduous).
Cruciferae (general): P. W. Ball, mfr., rl.
Barbarea: G. A. Matthews, mfr., bds., rl.
Thlaspi: Dr. D. P. Young, mfr.
Cochlearia: Dr. D. H. Dalby, mfr., rl.
Cardamine pratensis agg: D. E. Allen, rl.
Rorippa sect. *Nasturtium*: H. K. Airy-Shaw, mfr., s.
Viola odorata—V. palustris: Prof. D. Valentine.
Viola lutea—V. kitaibeliana: R. D. Meikle, cn.
Polygala: Dr. J. McNeill, mfr., r.
Hypericum: Dr. N. K. B. Robson.
Cistaceae: Dr. M. C. F. Proctor.
Tilia: H. A. Hyde (NMW).
Tamarix: D. R. Hunt.
Silene nutans agg: F. N. Hepper.
Silene, other spp.: Dr. S. M. Walters.
Dianthus: Miss S. Hooper, cn. (K).
Cerastium, annual spp.: E. Milne-Redhead, mfr., fl.
Stellaria: P. M. Benoit, mfr.
Sagina: F. R. Elliston-Wright, F. N. Hepper, mfr.

Arenaria: G. Halliday.
Herniaria: Dr. L. C. Frost, Dr. A. Melderis.
Montia: Dr. S. M. Walters, s.
Amaranthus: J. P. M. Brenan, mfr., cn.
Chenopodium: J. P. M. Brenan, mfr., cn., s.
Atriplex: P. W. Ball, Mrs. B. A. Hulme, mfr.
Salicornia: P. W. Ball, Dr. D. H. Dalby, Prof. T. G. Tutin, mfr.
Malva: Dr. N. K. B. Robson, mfr.
Erodium: P. M. Benoit, Dr. E. Warburg, mfr., cn.
Oxalis: Dr. D. P. Young, r.
Ulex: Dr. M. C. F. Proctor, M. J. Woodman (FRS), mfr.
Medicago: C. C. Townsend, mfr.
Lotus: J. B. Gillett, mfr.
Vicia: P. F. Hunt, mfr.
Rubus: E. S. Edees, bds., yfr., piece from current year's stem near apex but with fully developed leaves.
Potentilla: J. D. Grose, G. L. Smith.
Alchemilla: Dr. M. E. Bradshaw, Dr. S. M. Walters, rl.
Aphanes: Dr. S. M. Walters, mfr.
Rosa: Dr. R. Melville, mfr.
Prunus: Dr. E. F. Warburg, mfr., fl.
Sorbus: Dr. E. F. Warburg, mfr.
Crataegus: Dr. A. D. Bradshaw, mfr., fl.
Sedum: Dr. H. J. M. Bowen, Prof. D. A. Webb, stsh.
Saxifraga: Prof. D. A. Webb, stsh.
Epilobium: T. D. Pennington.
Circaea: P. M. Benoit, mfr.
Myriophyllum: A. C. Jermy.
Callitriche: R. D. Meikle, Dr. J. P. Savidge, mfr.
Umbelliferae (general): J M. F. Cannon, mfr., rl., r. (*Oenanthe*).
Apium: R. D. Meikle, mfr.
Euphorbia uralensis—E. cyparissias: Dr. T. Pritchard.
Polygonum aviculare s.l.: B. T. Styles, mfr.
Polygonum (other spp.): J. Timson.
Rumex: J. E. Lousley, mfr., rl.
Ulmus: Dr. R. Melville, mature short shoots of tree, NOT sucker or epicormic shoots.
Betula: Dr. E. F. Warburg, ckn., ml.
Populus: P. G. Beak, ckn., ml.
Salix: R. D. Meikle, Dr. E. F. Warburg, ckn., ml.
Erica: Dr. P. Gay, Prof. D. A. Webb.
Vaccinium (incl. *Oxycoccus*): Dr. N. K. B. Robson.
Limonium: A. C. Jermy.
Primula: Prof. D. H. Valentine, Dr. S. R. J. Woodell, fre.
Anagallis: Dr. F. H. Perring, P. G. Taylor.
Centaurium: Dr. A. Melderis.
Gentianella: Dr. N. Pritchard
Symphytum: A. E. Wade, r., cn.
Myosotis: A. E. Wade, mfr.
Calystegia: R. K. Brummitt, C. A. Stace.

Verbascum: D. Philcox, rl., cn., of all parts of plant, esp. filament hairs.
Veronica: E. B. Bangerter, Prof. J. H. Burnett (aquatic spp. only).
Rhinanthus: Dr. D. J. Hambler, Dr. E. F. Warburg.
Melampyrum: A. J. E. Smith.
Euphrasia: Dr. E. F. Warburg, Dr. P. F. Yeo.
Orobanche: Dr. D. J. Hambler, fre., cn. (incl. stigma), host, sketch of corolla shape.
Utricularia: P. G. Taylor, fre. or sm.
Mentha: R. M. Harley.
Thymus: Dr. C. D. Pigott.
Calamintha/Acinos: Miss C. Whiteford (BM).
Galeopsis: C. C. Townsend, fre. (*tetrahit* agg.).
Galium: Dr. K. M. Goodway.
Valerianella: C. C. Townsend, mfr.
Compositae (gen.): C. Jeffrey (K), mfr., rl., cn.
Senecio: C. Jeffrey (K), Dr. E. Rosser (NIAB), mfr., rl., cn.
Filago: D. Philcox.
Gnaphalium: D. Philcox.
Aster: D. Philcox, cn.
Erigeron: D. Philcox.
Arctium: Dr. F. H. Perring, Dr. W. A. Sledge, rl.
Carduus: Dr. W. A. Sledge, rl.
Cirsium: Dr. W. A. Sledge, rl.
Solidago: D. H. Kent.
Lactuca serriola-virosa group: D. R. Hunt, mfr.
Hieracium: C. E. A. Andrews, rl., cn. (esp. styles), date of gathering.
Crepis: J. B. Marshall (BM), mfr., rl.
Taraxacum: A. C. Jermy, fl. & fr. (for Prof. J. L. Van Soest).
Alisma: Miss P. Boyle (UCD), fre.
Zostera: Prof. T. G. Tutin.
Potamogeton: J. E. Dandy, Sir George Taylor.
Zannichellia: J. E. Dandy.
Allium: Dr. W. T. Stearn.
Juncus: Dr. J. G. Dony.
Orchidaceae: V. S. Summerhayes, fre., or sm. with cn.
Epipactis: Dr. D. P. Young, fre., or sm. with cn.
Dactylorchis: Prof. J. Heslop-Harrison, V. S. Summerhayes, P. Vermeulen, fre., or sm. with cn.
Sparganium: Dr. C. D. K. Cook.
Cyperaceae: (excl. *Eleocharis*), A. C. Jermy, mfr., r.
Eleocharis: Dr. S. M. Walters, mfr.
Carex: A. O. Chater, A. C. Jermy, E. C. Wallace, mfr., r.
Gramineae, esp. *Festuca*, *Poa*, *Bromus*, *Agropyron*, *Puccinellia*, *Vulpia* (not aliens): Dr. A. Melderis.
Gramineae, esp. aliens: Dr. C. E. Hubbard.
Glyceria: Dr. M. Borrill.
Poa, *Agropyron*: Prof. T. G. Tutin.
Dactylis: Dr. M. Borrill.
Charophyta: Mrs. S. P. Phillips (BM).

MISCELLANEOUS SUBJECTS

Biographical Details of British Botanists: D. H. Kent.
Collection and preservation of botanical specimens: E. Milne-Redhead.
Folklore: D. E. Allen.
Floras, Foreign: Dr. W. T. Stearn.
Floras, Local: N. D. Simpson.
Genetics and Cytology in relation to Systematics: Prof. D. H. Valentine.
Herbaria: D. H. Kent.
Nomenclature: J. E. Dandy.
Popular names: Miss C. M. Rob.
Systematic Works and Monographs: N. Y. Sandwith.
Vice-County Boundaries: J. E. Dandy.

SHORT NOTES

Potentilla rupestris L. in East Sutherland

A visit to a range of steep rocks in the south-east of Sutherland (v.c. 107) on 16th May 1961 was unexpectedly rewarded by the finding of a considerable colony of *Potentilla rupestris.* Tall clumps of the plant with their conspicuous clusters of white flowers were quite thickly scattered over the cliffs at an altitude of 300 to 500 feet, many being in inaccessible places high on the face, and very little was at all easy to reach. The rock was evidently strongly calcareous and the ledges on which the *Potentilla* grew were quite dry. Accompanying species included *Helianthemum chamaecistus, Anthyllis vulneraria, Galium boreale, Vicia angustifolia, Ajuga reptans* and *Thymus drucei.* The locality was well removed from habitations and the *Potentilla* was not seen away from the cliffs, which were surrounded by unsuitable habitats. In view of this, together with the abundance and general inaccessibility of the plant, it seems justifiable to regard *Potentilla rupestris* as native in this locality, even though this is far removed from its very few other British stations, in the Welsh Border country.—D. A. Ratcliffe.

Mibora minima (L.) Desv. in East Lothian

On 6th May 1961 I visited the East Lothian coast at Weak Law near Dirleton, to examine the rocks of the foreshore below the Smugglers' Cave for the fossil plant *Pitys dayi* Gordon. As I was not very successful in this search, I turned my attention to the living plants along the edge of the sand dunes. About 300-350 yards west of the Smugglers' Cave, approaching the point south of the island called Eyebroughty, I discovered a delicate little grass growing in neat tufts on the north face of the dunes immediately overlooking the shore. Later, I identified the grass as *Mibora minima,* and this was kindly confirmed for me by Dr. F. H. Perring and Dr. C. E. Hubbard, from whom I received the following details regarding its previous occurrence in East Lothian.

There is a specimen in the British Museum dated May 1851, collected by J. T. Syme from Gosford Links, a locality some miles nearer Edinburgh and south-west from Weak Law. This record is referred to in *Rep. Bot. Soc. & E.C.,* **5**, 845 (1920) and in Syme, *English Botany,* ed. 3, vol. **11** (1877).

In addition to this record for Gosford, *Mibora minima* was also found on Gullane Links, a locality nearer to Weak Law, by J. H. Balfour, also in the year 1851. References to this are given in *Phyt.,* **4**, 231 (1851), and *Bot. Gaz.,* **3**, 112 (1851). It was probably on the strength of these records that J. D. Hooker mentioned it as recorded in Haddington (now called East Lothian) in his *Student's Flora of the British Islands*, ed. **2**, 454 (1878).

The grass was believed to have been introduced and to have become extinct by 1868. If it was originally introduced, then it obviously has remarkable powers of persistence in this area. According to Dr. Hubbard, the two Mediterranean grasses *Parapholis strigosa* (Roth) C. E. Hubbard, and *P. incurva* (L.) C. E. Hubbard were both recorded from the East Lothian coast by G. Don early last century (Don, *Herbarium Brittanicum*, fasc. VIII, nos. 177 and 178). It is just possible that these species may also still survive along this stretch of coast line. Following is a list of plants found growing with *Mibora minima* on the north face of the dunes west of Weak Law (Grid Ref. NT 497858).

Aira caryophyllea L., *A. praecox* L., *Ammophila arenaria* (L.) Link, *Festuca rubra* L., *Galium verum* L., *Luzula campestris* (L.) DC., *Myosotis ramosissima* Rochel, *Poa pratensis* L., *Saxifraga tridactylites* L., *Senecio jacobaea* L., *Taraxacum laevigatum* (Willd.)DC., *Teucrium scorodonia* L., *Thalictrum minus* L., *Valerianella locusta* (L.) Betcke, *Vicia lathyroides* L., *Viola canina* L., *Brachythecium rutabulum* (Hedw.) B. & S., *Bryum erythrocarpum* Schwaegr., *Rhytidiadelphus triquetrus* (Hedw.) Warnst., *Rhytidiadelphus squarrosus* (Hedw.) Warnst.—A. G. Long.

Railway Colonists in the Isle of Man

To anyone familiar with the unusual character of the Isle of Man Railway it will come as no surprise that the weed-flora to be found on the 47 miles of track is also unusual in several respects. This is doubtless partly due to the use of small stones, not clinker-ash, for the permanent way, partly perhaps to the slowness and infrequency of the trains, and partly to the total absence in the island of such common railway colonists as *Chaenorhinum minus* (L.) Lange and *Senecio squalidus* L. Spraying, too, appears to be most infrequent.

The place of *Chaenorhinum minus* is taken, very neatly, by its close relative *Kickxia elatine* (L.) Dumort. Though once recorded in the 1860's as a garden weed, this species is now only known in Man on the railway and has so far been detected on three widely-separated stretches. On one of these *Filago minima* (Sm.) Pers. accompanies it in great abundance, on another *Euphorbia exigua* L. has spread up to join it from a centre of concentration in the south-east corner. The latter, like *K. elatine*, is now known almost exclusively as a weed of the railway rather than of cultivated land.

Euphrasia occidentalis Wettst., otherwise a plant of coastal turf in Man, has been noted on tracks in two quite different parts of the island, one of them five miles from the sea. On the other hand, the two coastal plants that have colonised railways so widely in England, *Cerastium atrovirens* Bab. and *Cochlearia danica* L., do not appear to have spread inland at all in Man.—D. E. Allen.

SEED-SOWING EXPERIMENTS IN KENT

The following information is extracted from the *Bulletin of the Kent Field Club*, **6**, 12 (1961).

SARRACENIA PURPUREA—sown in Gibbons Brook Bog, during 1960, R. GORER.

Seeds of *Cynoglossum germanicum*, *Teucrium botrys*, *Orchis militaris* and *Ophrys fuciflora* have been sown in carefully noted places at Stockbury Hill Wood Nature Reserve by Dr. F. Rose for experimental purposes.

BOOKS RECEIVED

Dublin Naturalists' Field Club. *A Supplement to Colgan's Flora of the County Dublin.* Pp. xii + 95. Stationery Office, Dublin. 1961. Price, 6/6. Nathaniel Colgan's *Flora of the County Dublin* was published in 1904. This Supplement is the result of many years exhaustive field-work by members of the Dublin Naturalists' Field Club. The work consists of a detailed list of the plants of Co. Dublin, with localities, and includes also data on species new to the flora of the county since Colgan's time, and a list of plants not recently seen.

Erskine, D. S. *The Plants of Prince Edward Island.* Pp. 270. Canada Department of Agriculture, Ottawa. 1960. Price $1.50.

Ross-Craig, S. *Drawings of British Plants,* Part XVI. *Compositae* (2) Plates 1-33. G. Bell & Sons Ltd., London. 1961. Price 9/6. A further part of this well-known series, covering genera from *Achillea* to *Senecio.*

Ross-Craig, S. *Drawings of British Plants,* Part XVII. *Compositae* (3). Plates 1-36. G. Bell & Sons Ltd., London. 1962. Price 10/6. The latest part of this series contains excellent illustrations of genera from *Carlina* to *Crepis.*

Sargent, H. B. *A Natural History of Porthleven in the County of Cornwall.* Pp. 65 + 6 photographs. Privately printed. Obtainable from the author, H. B. Sargent, 8 Bay View, Porthleven, Helston, Cornwall Price 13/-, post free. An account of the natural history of Porthleven, a small town situated on Mount's Bay, twelve miles east of Penzance, W. Cornwall. A systematic list of over 300 plants found in the area is given, with details of frequency.

OBITUARIES

Samuel William Carruthers (1866-1962). Dr S. W. Carruthers, who died on 6th April 1962, at the age of 96, was the elder son of William Carruthers (1830-1922) who was appointed Keeper of Botany, British Museum, in 1871, organised the transfer of the collections to the Natural History Museum in 1880, and retired in 1895. As a youth S. W. Carruthers showed outstanding promise as a botanist and, no doubt guided by his father, made a scholarly abstraction of Surrey records from authors such as How, Merrett, Blackstone and Hudson. These are in manuscript "Notes on the Botany of Surrey, 1882" in my possession, together with lists of plants he had collected in the county 1879 to 1882. While at school at Dulwich College he wrote the "Botany of Dulwich" which was printed in the Report of the College Science Society. When preparing my account of the "Relics of the Great North Wood" (*London Nat.*, **38**, 77-90; **39**, 31-36) I was astonished to learn that the author of the list published 76 years earlier was still alive, but although I received one letter from him, I failed to obtain any additional information. Dr. Carruthers practised medicine in Norwood for many years, and no doubt the demands of his profession and an active part in the affairs of the Presbyterian Church, later crowded botany out of his life, though he remained a member of the South London Botanical Institute to the end.—J. E. Lousley.

Rex Alan Henry Graham, né Knowling (1915-58.)—The very sudden death of Rex Graham at Richmond, on 14th December 1958, came as a great shock to the many members of the Society who knew him. Even now it is hard to believe that his vivid, ebullient personality is no longer with us.

He was born on 2nd July 1915, in the city of Westminster, and was educated at Stowe and later at Hertford College, Oxford, where he read Geology and rowed for the college. His interest in the British flora began at an early age, when he was encouraged by his mother who is herself a keen amateur botanist. It was the belief that hobbies and work should be kept separate which led him to read Geology and not Botany at Oxford, a decision which he later came to regret. He was never entirely happy in his work, devoting only his spare time to the study of the British flora, until he joined the staff at the Herbarium, Kew, in 1956, to work on the flora of Tropical East Africa.

In 1938, he changed his name to Graham, for family reasons, which has caused many people not to realise the extent of his activity within the Society. On the outbreak of war, however, botany was forgotten, and he was posted to Bermuda with the Cameron Highlanders. He also served on the Continent, and at the Highland Fieldcraft Training Centre, at Glen Feshie. It was during the war years that he became an accomplished Highland dancer.

After the war, he returned to civilian life and his interest in botany. He already knew a great deal about the British flora, having botanised widely with his mother when a boy. Perhaps his first big field trip was in 1925, when at the age of nine, he went to Teesdale with Lady Davy, Miss E. Vachell and his mother. He saw many of the rarities there, and the dates and localities are marked off in his copy of Fitch's Illustrations to Bentham and Hooker—a practice he kept up all his life. He joined the Society in 1934, and in the same year showed his interest in *Mentha* by contributing four mints for exchange; in following years he continued to distribute and comment on mints. In 1949 he was elected to the Council of the B.S.B.I., and in the following year led a successful meeting to study mints in Surrey. Between 1949 and 1958 he established himself as the leading authority on the genus *Mentha*, by writing several valuable papers, which appeared in *Watsonia*. He had become sceptical of the value of many of the varieties described in *Mentha*, and his paper on *M. aquatica* is largely an attempt to show this. He clarified the taxonomy and nomenclature of *M.* × *smithiana* R. Grah., and was the first to note the presence of *M.* × *maximilianea* in this country. He was already contemplating a world monograph at the time of his death. He had a quick, taxonomic eye, and readily came to decisions which he was always prepared to modify if need be. His large private herbarium, now in the writer's possession, contains a unique *Mentha* collection of great value, as well as a representative set of beautifully prepared specimens of the British flora. His work on the Tropical African flora was devoted mainly to the *Polygonaceae*, *Orobanchaceae* and the *Rosaceae*, of which his accounts have now been published. He was working on the *Capparidaceae* at the time he died.

I first met Rex in April, 1954, when attending my first B.S.B.I. Conference. I was still at school at the time, but he offered to take me out botanising with some friends. From then on we became very close friends, finding we had much in common. One of his great joys was to take me over the ground which he knew well, and in so doing he imparted to me much of his knowledge and love of Britain and its flora. Our Scottish trips I shall never forget. Usually we travelled with a tent and cooking equipment thrown into the back of a car. We camped in the most unlikely places—in cowsheds, by rivers, once in a deserted house, and on one memorable occasion by a distillery. One of the employees had been in Rex's regiment and remembered him. Plants, however, came first, and our long walks in the hills were always rewarding and exhilarating. Rex had a wonderful capacity for making friends wherever he went, and in all sorts of places. There are still two ghillies in Braemar waiting to avenge their defeat in a marathon darts match in the Invercauld Arms, by Oxford University 'A' team.

He got a great thrill from seeing rare or beautiful plants, and one of his greatest was his rediscovery of *Epipogium aphyllum*. His first reaction, very characteristically, was to calm his excitement with a pint of beer at the nearest inn, which he ever after referred to as 'Domus epipogii'. He then hurried back to look again at *Epipogium* in its most spectacular British locality.

His character was full of contradictions. To many, he may have seemed completely extrovert, his uninhibited enthusiasm being never abashed. Nevertheless, he was a deeply sensitive person, highly emotional concerning the people and things, such as music, that he loved. He was a good pianist, but played rarely after losing part of his thumb during the war. He also inherited from his uncle Harry Graham a brilliant flair for witty poetry. In this, nobody was spared from mention, a reason, no doubt, why it was never published.

The Society has undoubtedly lost a gifted and valuable member. Many of us still miss a great friend.—R. M. HARLEY.

IOLO ANEURIN WILLIAMS, F.L.S., F.Z.S. (1890-1962).—Iolo Williams, who died on January 18, 1962, at the age of 71, made a substantial, though mainly anonymous, contribution to the progress of botany in this country.

He was born at Middlesbrough on June 18, 1890, and educated at Rugby School and King's College, Cambridge. His father moved to Hindhead, and here young Iolo made the acquaintance of E. W. Swanton, the enthusiastic curator of Haslemere Educational Museum, who no doubt encouraged an early interest in natural history. On returning to civilian life after the 1914-18 War, he settled down to work as an author and journalist, and after occasional contributions to *The Times*, he joined the staff of that paper as its Museums Correspondent in 1936.

Williams' interest in Botany started early, and by the time he joined the Botanical Society and Exchange Club of the British Isles, and the Watson Botanical Exchange Club in 1925, he was able to contribute useful notes on critical sedges and other plants. He soon became friendly with some of the leading botanists of the time and joined them in private expeditions. One particularly successful trip was his visit to the Channel Isles with A. J. Wilmott and F. Druce in 1928, when many valuable records were made. He was elected a Fellow of the Linnean Society in 1926.

Botany, however, was only one of his many scholarly interests. First and foremost he was a poet. He was a bibliographer with a wonderful knowledge of book-collecting. He was an art historian and critic of water-colours, and his books and articles covered all these subjects. In addition, he was a journalist of outstanding skill and integrity, with a flair for detecting the slightest inaccuracy or humbug and stressing honest work which was new.

For 25 years, botanists have enjoyed regular reports and occasional leaders in *The Times* from Williams' pen which have set a standard of botanical reporting far higher than anything they have known before. In this way, he did much to further interest in the sounder additions to our flora, and in projects like the B.S.B.I. Maps Scheme.

Of the many examples which might be given of Williams' genius for detecting inaccuracies, perhaps the waterweed from the Longford River shown at our Exhibition in 1950 is as typical as any. This was exhibited as *Lagarosiphon major*, and as we were looking at it together, Williams whispered: "Is this alright"? When I pointed out that it had been named by the staff of a leading herbarium, he said: "Well, maybe, but I have a feeling that something is wrong". On the following Monday appeared an account of the plant as *Lagarosiphon* written by another journalist. Two days later, *The Times* had a leader headed "Plant Invaders" which discussed various waterweeds, and then neatly and kindly corrected the determination to *Elodea callitrichoides* and stated that it had been found earlier in the River Colne by Dr. George Taylor. The correction was a model of first-class journalism dealing with a delicate situation with extraordinary skill.

Help, based on his wide knowledge was freely available to his friends, and his suggestions, comments and corrections have played some part in many botanical undertakings of recent years. Although he had so much to offer, he published very little on botany under his own name. His best known scientific contribution is his description of *Bromus britannicus* as new to science (*J. Bot.*, **67**: 65-69, 1929), but, unfortunately, Holmboe had described the same grass only five years earlier as *B. lepidus*. He wrote *Flowers of Marsh and Stream* for the King Penguin series.

At a memorial service at St. Dunstans-in-the-West, Fleet Street, on February 22, 1962, there was a very large gathering of friends, including eminent representatives of all his many interests. Sir William Haley, editor of *The Times* gave the address, and said in conclusion: "Each one of us is the better in one way or another because we knew Iolo Williams. The memory of that large figure, and that even larger heart, will stay with us all our lives". All the botanists who knew him well, owe a great deal to Iolo, and he will be sadly missed at the meeting of our Society.

A lengthy obituary notice, with details of his other activities, appeared in *The Times* for January 19, 1962, and account of the memorial service on February 23, and short appreciations from friends on some of the intervening days. His herbarium has been presented to the Natural History Museum, London.—J. E. Lousley.

PERSONALIA AND NOTICES TO MEMBERS

LOTUS

Dr. Karin Olsson, Institute of Systematic Botany of the University of Lund, Botanical Garden and Botanical Museum, Lund, Sweden, is working on the taxonomy and cytology of *Lathyrus palustris, L. pratensis* and *L. sylvestris* and would be grateful for living plants, seed and herbarium material.

EPILOBIUM NERTERIOIDES Cunn.

Miss M. B. Gerrans, Dept. of Botany, British Museum (Natural History), Cromwell Road, London, S.W.7, is studying the distribution of *Epilobium nerterioides* in the British Isles and would be grateful for records, herbarium specimens and fresh material.

BUDDLEJA DAVIDII Franch.

D. H. Kent, 75 Adelaide Road, London, W.13, is studying the historical spread of *Buddleja davidii* in the British Isles, and would be grateful for records, especially of the occurrence of the plant in wild habitats before 1939.

KOELERIA

Dr. J. Ujhelyi, Département Botanique, Musée d'Historie Naturelle. Budapest XIV. Vajdahunyadvár, Hungary, is engaged on a revision of *Koeleria*. He would be grateful for seeds or living plants (in polythene bags) of British species.

NIKITA BOTANICAL GARDEN, CRIMEA, U.S.S.R.

The Nikita Botanical Garden, Crimea, U.S.S.R., is anxious to acquire herbarium material of common British plants. Members who have material which they are willing to give, or who are otherwise disposed to help, are asked to write to John Ounsted, The Headmaster, Leighton Park School, Reading, giving details.

FLORA OF NORFOLK

Dr. C. P. Petch and E. L. Swann (282 Wootton Road, King's Lynn, Norfolk), are collecting data relating to the flora of Norfolk. The latter would be glad to receive any information on the subject, particularly with reference to collections (other than those in the National Herbaria) and personal records and notes.

NORTH STAFFORDSHIRE JOURNAL OF FIELD STUDIES

The University of North Staffordshire and the North Staffordshire Field Club have combined to produce a new periodical—North Staffordshire Journal of Field Studies (incorporating the Transactions of the North Staffordshire Field Club).

The first number of the journal was published in 1961, and it will in future appear annually. The annual subscription is £1 5s. (for those who register for not less than three years, £1 2s. 6d. per annum.) Applications should be addressed to Professor J. M. T. Charlton, Dept. of Classics, University College of North Staffordshire, Keele, Staffordshire.

THE NATIONAL NATURE WEEK

As many members of the Society will know, the Council has decided to support the National Nature Week Exhibition, which is being sponsored by the Council for Nature and which is being held in the Royal Horticultural Society Halls in May next year. Plans for our exhibit, which will illustrate the society's aims and achievements, are well in hand and the Council has made the necessary financial support available. There are however many needs that can on ly be supplied by the members of the Society themselves. For example we shall need some good plant portraits, suitable for considerable enlargement, and also a good photo of members on a field meeting or similar activity. If anyone has such a thing, a photo of a field meeting as far back in the history of the Society as possible would be particularly welcome. It could form an interesting comparision with a picture of a recent meeting and serve to emphasise the tradition and continuity of our activities. If any of our keen photographers has suitable facilities and would be prepared to offer his services for making enlargements for the exhibit we should be particularly grateful. Nearer the time we shall be asking for volunteers to help man the exhibit, to deal with inquiries and to (we hope) recruit new members from the crowds that will come to the Exhibition. We shall be delighted to receive offers of help and suggestions of all kinds from members. This is an important undertaking in which all major national Natural History Societies, Naturalists Trusts, etc., together with organisations like the Nature Conservancy and Forestry Commission are taking part. It should make a very significant contribution towards Conservation and Natural History Education in this country. The B.S.B.I. exhibit is Your exhibit—Please give it your enthusiastic support. John F. M. Cannon, Hon. Secretary, B.S.B.I. Special Exhibition Committee, c/o Dept. of Botany, British Museum (Natural History), Cromwell Road, London, S.W.7.

ARCHIVES OF THE SOCIETY

It has been decided by Council that the Society should collect together pamphlets, articles, photographs and other materials relevant to its history and organization. Any member who possesses items which may be of interest in this connection is asked to contact D. E. Allen, Botanical Society of the British Isles, c/o Dept. of Botany, British Museum (Natural History), Cromwell Road, London, S.W.7.

BACK NUMBERS OF "WATSONIA" AND "PROCEEDINGS"

Part of the Society's revenue is obtained from the sale of sets of *Watsonia* and *Proceedings* to booksellers and libraries.

Unfortunately, certain parts of both periodicals are now in short supply and it will soon become difficult to prepare complete "runs". The numbers concerned are *Watsonia*, Vol. 2, Parts 5 and 6, and Vol. 3, Part 5, and *Proceedings*, Vol. 2, Part 4. Members who have any of these parts that they no longer require are invited to assist the Society by sending them to Mr. E. B. Bangerter, c/o Dept. of Botany, British Museum (Natural History), Cromwell Road, London, S.W.7.

B.S.B.I. BOOK SERVICE

Many county Floras and other botanical books are out of print and difficult to obtain and the officers of the Society receive many enquiries from members as to where they may be obtained.

A card index of members' desiderata has now been prepared with the object of assisting them to obtain books they need to carry out their studies.

The index has been prepared by the Hon. Assistant Secretary, Mr. D. H. Kent, 75 Adelaide Road, London, W.13, and members desiring to make use of this facility are invited to write to him giving details of the books which they are anxious to acquire. A stamped addressed postcard, for reply, should be sent for each book required. It must be pointed out that some botanical works are very scarce indeed and it may be some time before they can be tracked down; every effort will, however, be made to trace copies of books required.

Members who have botanical books for disposal are also invited to write to Mr. Kent giving details of the volumes concerned and their prices.

THREATS TO BRITISH FLORA

Members are urged to report to Dr. D. H. Dalby, 108 Gordon Road, Camberley, Surrey, any threats to the British flora. The Council has appointed a Conservation Committee to deal with such matters and every effort will be made "to promote in every way possible the conservation of the British flora".

TOXIC SPRAY DAMAGE

Any damage due to the spraying of roadside verges with toxic chemicals should be reported immediately to the Secretary of the B.S.B.I. Conservation Committee, (Dr. D. H. Dalby, 108 Gordon Road, Camberley, Surrey), who will send a form listing the detailed information required by the Nature Conservancy. These forms have been prepared after discussions between the B.S.B.I. and the Conservancy, and when completed will be forwarded to the Concervancy who are carrying out active work on this subject.

TRANSPLANT AND INTRODUCTION EXPERIMENTS

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